

SOIL SURVEY

Obion County Tennessee



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
TENNESSEE AGRICULTURAL EXPERIMENT STATION
Issued January 1973

Major fieldwork for this soil survey was done in the period 1963-66. Soil names and descriptions were approved in 1966. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1966. This survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. It is part of the technical assistance furnished to the Obion County Soil Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SURVEY contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Obion County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol. It lists the capability unit and woodland group for each soil and shows the page where each kind of soil and each capability unit is described.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the

information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units.

Foresters and others can refer to the section "Use of the Soils for Woodland." A table in this section shows groupings of soils according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Management of the Soils as Wildlife Habitat."

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain estimates of soil properties and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Obion County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

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I

SOIL SURVEY OF OBION COUNTY, TENNESSEE

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE,
IN COOPERATION WITH THE TENNESSEE AGRICULTURAL EXPERIMENT STATION

OBION COUNTY, in the northwest corner of Tennessee (fig. 1), occupies an area of 352,000 acres, or about 550 square miles. The soils range from steep, well drained, and loamy on hillsides to nearly level, poorly drained, and clayey on swampy bottom lands. Between these two extremes are the gently rolling soils of the uplands.

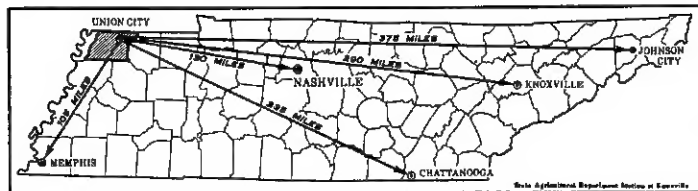


Figure 1.—Location of Obion County in Tennessee.

A strip along the western edge of the county is the eastern edge of the broad, flat bottom land of the Mississippi River. About half of this strip consists of soils that formed in sediments from the river, and the rest, of soils covered with recent loamy sediments washed from the uplands. Most of the soils on bottom lands are well suited to farming.

Soils high in silt content are on all the uplands. They formed in loess deposits as much as 80 feet or more thick. The deposits are about 50 feet thick in the western part of the county but are only about 15 feet thick in the eastern part. The steep, hilly soils in the western part are well drained. The gently rolling soils on broad flats in the eastern part are poorly drained. The gently rolling soils of the uplands have a fragipan at a depth of about 24 inches. Elevation in the uplands ranges from about 280 to 500 feet. In general, the upland soils are easy to work and are suited to many crops, but the sloping soils are readily eroded if cultivated.

Soils rich in silt are on the bottom lands along streams that dissect the uplands. They range from well drained on some creek and branch bottoms to poorly drained on the swampy river bottoms. In areas where drainage is adequate, these soils are well suited to many crops. The lowest part of the county is the bottom land. The elevation here ranges from about 265 to 400 feet.

In a fairly large acreage in Obion County, the surface layer is dark colored, which is characteristic of many soils

in the Midwest. The dark colors, along with other soil characteristics, suggest that a transition from the southern climate and vegetation to the midwestern climate and vegetation begins in this general area.

General Nature of the County

Obion County, established in 1823, was named for the Obion River. Obion is an Indian word meaning "many prongs." Until 1870, the county included the area that is now Lake County.

In 1960, the population of the county was 26,957. Union City, the county seat and largest town, had a population of 8,837.

Industry is important to the economy of the county. Manufacturing plants are located in or near Union City, South Fulton, Troy, Obion, Trimble, and Kenton. Recreation is also a major source of income (fig. 2). The Obion River attracts duck hunters. Reelfoot Lake attracts fishermen as well as hunters from several States.

According to the 1964 U.S. Census of Agriculture, there were 1,533 farms in Obion County. Of this number, 292 farms were 10 to 49 acres in size, 1,137 farms were 50 to 499 acres, and 104 farms were 500 acres or more. Farms made up about 79.5 percent of the total acreage. About 51,679 acres was in soybeans, 43,037 acres in corn, and 9,155 acres in cotton. About 77,437 acres was pastured, and 45,805 acres wooded. The woodland is mostly in areas too steep or too wet for farming.

Most farms are of a general type. Some livestock is raised, mainly hogs or beef cattle. There are several scattered dairy farms in the county and also several small vegetable farms and fruit orchards.

Obion County has a complete drainage system. Surface runoff collects in small streams or branches and then flows into progressively larger streams that empty into the Obion River. The Obion River flows into the Mississippi River. Bayou du Chien drains into Reelfoot Lake. Running Reelfoot Bayou connects Reelfoot Lake to the Obion River. Reelfoot and Indian Creeks are the main streams through which surface runoff from the uplands drains into Reelfoot Lake. Other streams that collect runoff from the uplands are Pawpaw, Brown, Clover, Richland, Mill, Cane, Davidson, Troy, Houser, Grove, Martin, Cypress, Harris Fork, Grass, Deer, and Mud Creeks.



Figure 2.—Farm pond on Memphis silt loam, 20 to 30 percent slopes, eroded. This pond is used for livestock and for recreation.

Climate¹

The climate of Obion County is characterized by relatively mild winters, hot summers, and abundant rainfall. Although the county is located far inland, it lies in the path of cold air that moves southward from Canada and of warm, moist air moving northward from the Gulf of Mexico. Extreme and frequent changes in the weather pattern are common.

Temperature and precipitation data representative for the county are shown in table 1, as recorded by the National Weather Service at Union City. There may be daily variations in weather at different locations in the county, but differences in altitude are not great enough to cause significant changes in climate.

Temperature.—Average annual temperature at Union City is 59° F. Temperature extremes were 109° and -23° during the period of record. Prolonged periods of very cold or very hot weather are rare. Occasional periods of very mild temperature occur almost every winter. Conversely, during the peak in summer, occasional periods of cool, dry weather break up periods of hot, humid weather. The greatest change in the average daily maximum and minimum temperatures occurs during October and November, when outbreaks of cold air move southward. Average daily minimum temperature ranges from slightly below freezing in winter to the upper sixties in summer. The average daily maximum temperature ranges from about 45° in winter to the low nineties in summer.

The average dates of last freezing temperatures in spring and first in fall are March 31 and October 28, respectively, at Union City. The interval between these dates, the average growing season, is 210 days. Probabili-

¹ Prepared by JOHN VAIKSNORAS, State climatologist, National Weather Service, Nashville, Tenn.

TABLE 1.—*Temperature and precipitation*

[All data from Union City, Obion County, Tenn., 1931–60. Elevation 340 feet]

Month	Temperature ¹				Precipitation			
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—		Average snowfall
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—	
	° F.	° F.	° F.	° F.	In.	In.	In.	In.
January.....	47. 1	28. 0	67	9	4. 93	1. 3	10. 4	2. 0
February.....	50. 1	29. 3	68	13	4. 31	1. 1	7. 5	2. 1
March.....	58. 2	36. 3	77	21	4. 96	1. 7	8. 2	1. 5
April.....	70. 0	46. 9	84	33	4. 57	1. 9	6. 6	. 1
May.....	79. 7	56. 1	91	43	4. 82	1. 2	7. 2	0
June.....	88. 6	64. 7	98	54	3. 99	1. 3	8. 1	0
July.....	91. 4	67. 8	100	58	3. 90	1. 0	6. 7	0
August.....	91. 1	66. 6	100	56	2. 80	. 9	6. 0	0
September.....	85. 0	58. 2	97	44	3. 17	. 6	4. 9	0
October.....	74. 5	46. 2	88	32	2. 91	1. 2	5. 1	0
November.....	59. 3	35. 4	76	21	4. 36	1. 7	6. 7	. 3
December.....	49. 2	29. 5	66	15	4. 24	1. 9	7. 3	. 8
Year.....	70. 4	47. 1	² 101	² 4	48. 96	36. 9	62. 9	6. 8

¹ Temperatures were measured in standard Weather Bureau instrument shelters where thermometers were 4.5 feet above ground. On clear, calm nights shelter-level temperatures are usually about

5 degrees warmer than the air temperatures near the ground. This difference can amount to as much as 12 degrees.

² Average annual extremes.

ties of freezing temperatures (32, 28, and 24° F.) after any date in spring and before any date in fall are shown in figure 3. For example, to find the date in spring after which there is a 75 percent probability of a temperature of 28° F. or lower, locate "75 percent" at the bottom of the graph and follow an imaginary line upward until it intersects the line labeled 28° F. The right margin opposite this point shows the date to be after March 12. To find the date in fall before which there is a selected probability of freeze, read downward from the top of the graph to the desired fall temperature line (24, 28, and 32° F.), then to the left margin for the date.

The freeze-free growing season is long enough to permit the planting and maturing of crops, such as cotton, soybeans, corn, and vegetables. Winters are usually mild enough that fall-sown small grain survives and furnishes considerable grazing for livestock during winter. Many days in winter have a temperature above 40° F., and pasture grasses make substantial growth in this season.

Precipitation.—Obion County has an average annual rainfall of approximately 49 inches. Normally it has enough moisture for farming and a sufficient water supply for other uses. Total annual rainfall at Union City ranged from 31.51 inches in 1941 to 72.56 inches in 1950. As shown in table 1, precipitation is normally heaviest in winter and early in spring. Late in spring and early in summer, when local showers and thunderstorms are most frequent, precipitation is near the monthly average. It is generally lightest late in summer and early in fall; high-pressure areas are most frequent at this time of the year. Table 1 shows that in 1 year in 10, on the average, only about 1 inch of rain falls each month during the growing season.

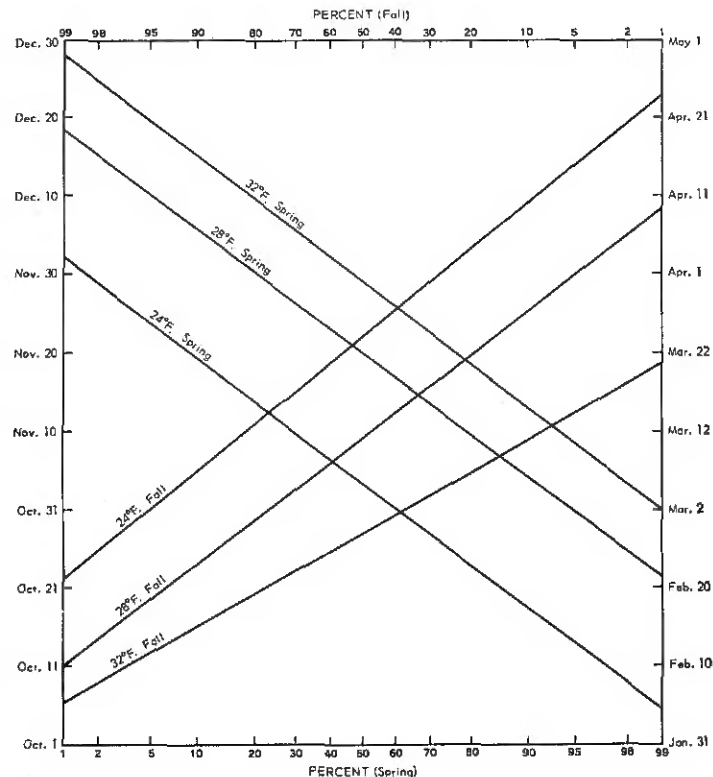


Figure 3.—Percent probability of given temperatures occurring in fall before any date (top scale) and in spring after any date (bottom scale).

It also shows that in 1 year in 10, 4.9 inches or more of rain falls each month. Thus, the periods of drought are offset by periods of plentiful to excessive precipitation.

The county is subject to heavy rainfall, which frequently totals more than 4 inches. Maximum precipitation in a 24-hour period has exceeded 5 inches at nearby locations. The highest monthly precipitation at Union City during the period of record was 18.53 inches in January 1937, the month of the great Mississippi Valley flood. Flash floods are frequent along small rivers throughout the county.

Severe storms.—Severe storms are infrequent in this county. Only six tornadoes were reported during the period 1916–64. Tornadoes in May 1917, however, resulted in heavy loss of life and property. The county is too far inland to be damaged by tropical storms. Hailstorms occur only about twice a year.

Humidity, wind, and clouds.—The average annual humidity in Obion County is approximately 70 percent. Relative humidity throughout the day usually varies inversely with the temperature and is, therefore, highest early in the morning and lowest early in the afternoon. There is also an annual variation in relative humidity; the average daily variation is highest in winter and lowest in spring.

Prevailing winds are southerly, and the average wind-speed is about 9 miles per hour. Wind direction changes frequently. Winds are usually lightest early in the morning and strongest early in the afternoon.

Average cloud cover is less than six-tenths. Sunshine is abundant, especially during the growing season.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Obion County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey (5).²

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Grenada and Sharkey, for example, are the names of two soil series. All

the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Loring silt loam, 2 to 5 percent slopes, is one of several phases within the Loring series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. A soil complex is one such kind of mapping unit shown on the soil map of the county.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Routon-Bonn silt loams is an example.

In most areas surveyed there are places where the soil material is so shallow or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. A land type in Obion County is Smoothed land, Memphis soil material.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland and rangeland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. Then they adjust the groups according to the results of their studies and consultation.

² Italic number in parentheses refers to Literature Cited, p. 57.

Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Obion County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The nine soil associations in Obion County are described in the following pages.

1. Swamp-Bowdre-Sharkey association

Swampy land and somewhat poorly drained and poorly drained, level, clayey soils on the Mississippi River bottoms

This soil association occupies the northwest corner of the county. Nearly two-thirds of this association is level, dominantly swampy terrain (fig. 4) in which there are many small, crooked sloughs. Much of this area is no higher than the high-water level of Reelfoot Lake. It is ponded for long periods; thus, the sediments deposited are clay. The rest of the association consists of a succession of broad, waist-high ridges, up to one-fourth of a mile wide, that are broken by shallow sloughs 50 to 500 feet wide.

This association makes up about 3 percent of the county. It is about 40 percent Swamp, 10 percent Bowdre soils, and 10 percent Sharkey soils. The rest is less extensive soils.

All the soils in the association formed in sediments deposited by the Mississippi River. Differences in elevation account for most differences among the soils.

Swamp occupies the lowest positions along Reelfoot Lake. It supports only water-tolerant vegetation, such as cypress trees.

Bowdre soils are on slight rises within the low, broad flats. They are somewhat poorly drained. The upper 10 to 20 inches is very dark grayish-brown, plastic silty clay or clay. Below this is brown, loamy material mottled with gray.

Sharkey soils are poorly drained. Their surface layer is very dark grayish-brown, plastic clay less than 10 inches thick. Their subsoil is gray, very plastic clay.

The highest part of the association is a succession of slight ridges and sloughs. Tiptonville, Reelfoot, and For-

estdale soils are on the slight ridges, and Iberia and Sharkey soils are in the sloughs. The moderately well drained, loamy Adler soils are at the eastern edge of the association, next to the steep hills.

About 60 percent of the association is low, wet woodland, most of which is owned by the Tennessee Game and Fish Commission and managed by the U.S. Fish and Wildlife Service. This wooded part is a most favorable refuge for waterfowl but is poorly suited to most other uses. Some open fields are used to grow feed for waterfowl. The higher, cleared part of the association is well suited to farming and to all the crops commonly grown. Cotton, corn, and soybeans are the main crops. The average farm is about 150 acres in size.

2. Adler-Convent-Falaya association

Moderately well drained and somewhat poorly drained, level, loamy soils on first bottoms

This soil association occupies level first bottoms in the western part of the county. About half of the association is along streams, mainly Reelfoot Creek, that drain through the steep, hilly parts of the county. These areas are about a half mile wide at the mouth of the creek, but taper with increasing distance upstream into the uplands. They slope gently away from the stream toward the uplands. They are flooded several times each year, occasionally during the crop season. Generally the streambanks are the highest parts.

The rest of this association is a strip about 8 miles long and $\frac{1}{4}$ to 1 mile wide on the outer edge of the Mississippi River bottoms, between the steep hills to the east and Running Reelfoot Bayou or Reelfoot Lake to the west. This part generally is highest at the foot of the steep hills. Overflow is less extensive and less frequent on the bottoms along the Mississippi River than in other parts, but water collects and drains away slowly. Drainage ditches form nearly square or rectangular fields 10 to 200 acres in size.

This association makes up about 8 percent of the county. It is about 35 percent Adler soils, 35 percent Convent soils, and 20 percent Falaya soils. The rest is less extensive soils.

The soils in this association formed in loamy sediments recently washed from the nearby steep hills. The sediments are several feet thick on the creek bottoms, are 5 to 10 feet thick at the foot of the steep hills, and become thinner with increasing distance from the hills as they spread out over the Mississippi River bottoms. They are commonly about 3 feet thick near Running Reelfoot Bayou.

Adler and Convent soils are on the bottom land along Reelfoot Creek and the Mississippi River. Falaya soils are farther back from the creek, next to the hills.

Adler soils are moderately well drained. They are very friable silt loam to a depth of 5 feet or more. They are brown and have a few grayish mottles in the upper 20 inches.

Both Convent and Falaya soils are somewhat poorly drained. They occupy spots where water collects and drains slowly. Convent soils are commonly silt loam to a depth of 5 feet or more. They are mainly dark grayish brown or grayish brown mottled with gray and brown. Falaya soils are silt loam throughout. They are generally dark grayish brown and grayish brown and have a few mottles below the surface layer.

Other soils in this association are the well drained Morganfield and Worthen soils and the moderately well



Figure 4.—Typical area in soil association 1. Bowdre and Sharkey soils and Swamp are in low, wooded area in foreground. Tiptonville, Reelfoot, and Forestdale soils are in cleared field in background.

drained Tiptonville soils, all in the highest areas where drainage is good, and the Reelfoot and Commerce soils, in level areas where drainage is poor.

Nearly all this association is used for cotton, soybeans, and corn. There are a few commercial vegetable farms, a few tracts in pasture, and a few wooded tracts. Most of the farm areas are parts of farms that extend down from the nearby uplands. Entire farms of about 150 acres are on the Mississippi River bottoms. There are only a few farm homes, including those in the town of Samburg.

Most of the association is well suited to farming. Cotton, corn, soybeans, vegetables, and pasture and hay crops grow well. Floods and standing water are serious limitations, especially near the mouth of Reelfoot Creek. In some fields, excess water delays planting in spring, and in others floods sweep away young, emerging crops. After

several days the excess water is removed through drainage ditches.

There are only a few favorable building sites in this association. The eastern shore of Reelfoot Lake is a highly developed recreational center. Alternate fishing and hunting seasons keep the facilities in use throughout most of the year.

3. *Memphis association*

Well-drained, rolling to steep, loamy soils on uplands

This soil association, commonly known as the Lake Hills, is in the western part of the county. The landscape is one of rolling to steep hills and narrow ridges that rise abruptly to a height of 100 to 200 feet above the Mississippi River bottoms (fig. 5). The ridgetops are narrow and winding. Steep hillsides slope from the ridgetops to long, crooked drains that form deep, narrow hollows. Slopes



Figure 5.—Landscape in soil association 3. The steep loess hills are 100 to 200 feet above the Mississippi River bottoms. Adler soils are in low areas in the foreground. Memphis soils are on hills in the background.

range from 20 to 50 percent. Generally the steepest hillsides, the narrowest, most winding ridgetops, and the hollows are in the western part of the association.

This association makes up about 28 percent of the county. It is about 80 percent Memphis soils. The rest is made up of less extensive soils.

All the soils developed in loess deposits. These deposits generally are about 40 feet thick, but the thickness ranges from 3 feet at the foot of the hillsides to 80 feet at the ridgetops.

The well-drained Memphis soils are on ridgetops and hillsides. They have a surface layer of brown silt loam and a subsoil of dark-brown silt loam or silty clay loam.

The gently sloping Loring soils are in the eastern part of the association. They are loamy, are moderately well drained, and have a fragipan. The moderately well drained Adler soils and the somewhat poorly drained Convent soils are on the narrow, winding first bottoms.

Woodland covers about half of this association. Many of the steep hillsides are used for crops and pasture, but the steepest are wooded. Most of the cultivated acreage is on ridgetops and in hollows. Many hillsides that were previously cleared are now covered with briers, bushes, wild grasses, and small trees. Farms are of the general type and are commonly about 130 acres in size.

The steep slopes limit use of the soils for farming and for residential and commercial development. In areas where vegetation is lacking or sparse, runoff is rapid and erosion damage is serious. Throughout the association are scattered deep, caving gullies. Smaller gullies are even more common.

This association is suited to trees, pasture, row crops, and wildlife habitat. The deep hollows formed by the steep hillsides provide an almost unlimited number of lake sites.

4. Routon-Calloway-Center association

Poorly drained and somewhat poorly drained, level, loamy soils on uplands

Broad, flat uplands containing a few saucerlike depressions and narrow, shallow drainageways make up most of this association. Irregularly shaped knolls and slight ridges rise from 3 to about 10 feet above the surrounding flats. Scattered tracts of this association ranging from about 600 to 10,000 acres in size occur throughout most of the county. The largest surrounds Woodland Mills, which is in the north-central part of the county. A smaller tract south of Obion and in the south-central part is surrounded by the Obion River bottoms. The rest is on benches. The benches are bordered on one side by gently rolling uplands, which rise several feet higher than the benches, and on the other side by short, sloping hillsides or sharp, vertical banks that drop abruptly 3 to 15 feet to the first bottoms. Some tracts are flooded by the nearby streams. Even in tracts that are not flooded, pockets of standing water and a high water table are damaging in winter and spring.

This association makes up about 7 percent of the county. It is about 45 percent Routon soils, 35 percent Calloway soils, and 10 percent Center soils. The rest consists of less extensive soils.

All the soils developed in loess deposits.

Routon soils are poorly drained. They are silt loam except for a thin layer of silty clay loam below a depth of 2 feet. They are grayish and mottled throughout the profile.

Calloway soils are somewhat poorly drained. They are silt loam as far down as the fragipan. The pan is silt loam or silty clay loam. The plow layer is dark grayish brown. The subsoil, which extends to a depth of about 2 feet, is yellowish brown mottled with gray.

Center soils have a surface layer of dark grayish-brown and pale-brown silt loam and a subsoil of silt loam and silty clay loam that is mottled with yellowish brown and grayish brown.

Less extensive in this association are the Grenada and Bonn soils. Grenada soils are moderately well drained and have a fragipan. Bonn soils are poorly drained and have a high sodium content in the subsoil.

Soybeans and pasture are the main crops. Cotton, corn, and small grain are grown also. Corn and soybeans are the main crops in the northern part of the county; there are also livestock farms. Soybeans and cotton are the main crops in the southern part. Farms of about 250 acres are common. A few woodlots, generally less than 20 acres in size, are on the lower, wetter spots. The towns of Woodland Mills, Obion, and Kenton are in this association.

This soil association is well suited to farming and to nearly all row crops commonly grown in the county. Wetness and the tight, restricting subsoil are limitations for some crops. Only the highest, well-drained sites are suited to alfalfa and other long-lived crops. Installing drainage ditches, selecting crops that are not restricted in the root system by a fragipan, and selecting crops that tolerate wetness are factors to be considered in management.

The level topography of this association makes the construction of large ponds and lakes expensive, but it is suitable for farm ponds. Field borders and small, irregu-

larly shaped spots provide suitable sites for growing wildlife food and cover. Many suitable sites are available for farmsteads. Excess water is a limiting factor in residential, industrial, and commercial development.

5. Grenada-Loring-Memphis association

Moderately well drained and well drained, undulating to hilly, loamy soils on uplands

This soil association is in the eastern half of the county. The landscape is one of gently rolling uplands; broad flats; gently sloping, fairly wide hilltops; fairly short hillsides; and small, winding streams. Slopes are commonly 5 to 12 percent but range to 20 percent. Many hilltops form 30- to 50-acre fields; some are even larger. Small streams in the uplands form a network of small branches that merge and form a complete drainage system.

This association makes up about a third of the county. It is about 40 percent Grenada soils, 20 percent Loring soils, and 15 percent Memphis soils. The rest is made up of less extensive soils.

All the soils in the association formed in silt deposits that are generally between 15 and 25 feet thick.

Grenada soils, which are moderately well drained, have a plow layer of brown silt loam. In uneroded tracts the subsoil is yellowish-brown silt loam to a depth of 2 feet. Below this is a fragipan.

Loring soils, which are also moderately well drained, have a plow layer of brown silt loam in uneroded areas and a subsoil of dark-brown or dark yellowish-brown silt loam that extends to a depth of 2½ feet. The next layer is a weak fragipan.

Memphis soils are well drained. They have a plow layer of brown silt loam and a subsoil of brown or dark-brown silt loam and silty clay loam.

Other soils in the association are the somewhat poorly drained Calloway soils, the poorly drained Routon soils, and the moderately well drained Collins soils.

Nearly all this association is used for row crops grown in rotation with hay and pasture crops. Soybeans, corn, and cotton are grown on much of the association each year. Cotton is grown also, but mainly in the southern part. Pastures are chiefly tall fescue, tall fescue and clover, and common lespedeza. Common hay crops are red clover, lespedeza, alfalfa, and sericea lespedeza. Most of the woodland is on wet spots and steep hillsides. Some small, wooded areas are in the gently rolling uplands.

Many well-kept farmsteads occur throughout this association, including the towns of Union City, South Fulton, and Troy. Farms of the general type and about 150 acres in size are common. They are mostly owner operated.

The favorable drainage and the gently rolling topography make this soil association well suited to many uses. Only a few small tracts are so steep or so badly eroded that they are limited to use for woodland. Practically all the soils are well suited to row crops grown in rotation with hay or pasture.

Most of the livestock water and irrigation water comes from wells and farm ponds, all of which produce an abundant supply. This association provides many sites favorable for residential, industrial, and commercial development.

6. *Fountain-Dekoven-Center association*

Poorly drained and somewhat poorly drained, level, loamy soils in Houser Valley

This soil association is in Houser Valley, locally known as the Black Lands. It is in the central part of the county. There are many large, level, square and rectangular fields, 10 to 30 acres in size, that are bordered by straight fence rows and field ditches. The ditches drain into stream channels, which in turn drain into the Obion River. Fields next to stream channels are occasionally flooded but are seldom covered by overflow. Water stands in pockets, and the water table is high in winter and spring. A few round knolls and narrow winding ridges rise 1 to 6 feet above the surrounding flats. These are generally 5 to 50 acres in size. There are also a few scattered, shallow, irregularly shaped depressions, generally 1 to 10 acres in size throughout the association. These are only a few inches to 1 foot or 2 feet lower than the surrounding flats.

This association makes up about 3 percent of the county. It is 45 percent Fountain soils, 30 percent Dekoven soils, and 15 percent Center soils. The rest is Alder and Convent soils.

It is believed that most of this association was once a lake. The soils in this association, however, developed in more recent silt deposits.

The poorly drained Fountain soils are on the flats. They have a surface layer of dark grayish-brown silt loam and a subsoil of dark-gray silt loam.

Dekoven soils are in slight depressions. They have a surface layer of very dark grayish-brown silt loam and a subsoil of very dark gray and dark gray silty clay loam.

Center soils are on the knolls and ridges. They have a plow layer of dark grayish-brown silt loam. Below this is pale-brown silt loam. The subsoil is yellowish-brown silt loam mottled with shades of gray.

Alder and Convent soils are on first bottoms along stream channels.

Practically all the association is used for row crops, hay, and pasture. Row crops are mostly soybeans and corn. A few fields are in cotton. Pastures are mostly tall fescue or tall fescue and clover. Red clover and lespedeza are the favored hay crops. A few fields are in winter wheat. Soybeans commonly are planted immediately following the wheat harvest. The few trees in this association are mainly along stream channels, in fence rows, or around farmsteads.

Fertile soils and large, nearly level fields make this a favored farming area. Farm ownership seldom changes. Cotton, corn, soybeans, small grain, and pasture are desirable crops, even though some fields are flooded a few days in winter and spring. Excess water is normally removed through drainage ditches. Only the higher, well-drained sites are suitable for residential, commercial, and industrial development.

7. *Falaya-Waverly-Collins association*

Poorly drained to moderately well drained, level, loamy soils on first bottoms

Long, wide, nearly level first bottoms that meander through the gently rolling uplands make up most of this association. The rest is along the upper reaches of the Obion River and its tributaries. Most of the crooked, winding ditches that once drained this bottom land have been replaced by ditches that curve smoothly through the

area. The bottoms slope gently away from the stream toward the uplands; most are flooded nearly every year. Floodwater drains from many fields within 2 hours after a heavy rain. Other fields, particularly those on or near the river bottoms, are low, and water stands for several days. Generally narrow strips along the stream channels are the highest parts of the association.

This association makes up about 10 percent of the county. It is about 60 percent Falaya soils, 20 percent Waverly soils, and 15 percent Collins soils. The rest is Adler and Convent soils.

All of the soils formed in sediments recently washed from the gently rolling uplands. All are silt loam to a depth of 5 feet or more.

Falaya soils are somewhat poorly drained. Their plow layer is dark grayish brown. The next layer is mottled grayish brown and gray.

Waverly soils are poorly drained. They occupy low areas in which water accumulates. Their plow layer is dark grayish brown. The next layer is mottled grayish brown and light gray.

Collins soils are moderately well drained and are on the highest sites. They are dominantly brown to a depth of about 3 feet. Below this they are gray and dark gray.

Adler soils are moderately well drained. Convent soils are somewhat poorly drained.

Nearly all this association is cultivated each year. Soybeans and corn are the main crops. Cotton and some pasture, mostly tall fescue and clover, are grown in the southern part of the county. The few small woodlots are mostly on the lower, wetter areas. Most of the farmed areas extend down from the surrounding, gently rolling uplands. There are few, if any, entire farms within the association.

This association is suited to many crops. Row crops that grow in the summer and crops that tolerate winter wetness, such as tall fescue, are well suited to the bottom land. Excess water is a limiting factor. Flooding occurs mostly in winter and spring. The existing drainage ditches normally remove the floodwater before planting time. There are few, if any, favorable residential and industrial sites in this association.

8. *Waverly-Falaya-Swamp association*

Poorly drained and somewhat poorly drained, level, loamy soils and swampy land on first bottoms

This soil association occurs as a strip 1 to 2 miles wide and about 20 miles long. The landscape is one of low, nearly level, and in places swampy bottom land along the Obion River. Segments of the crooked, winding stream channels that once drained this association form long, narrow, crooked lakes. Most of the winding stream channels have been replaced by a large channel that curves smoothly through these wet bottom lands. Flooding is likely during long periods of heavy rainfall, usually in winter and spring.

This association makes up about 7 percent of the county. It is about 65 percent Waverly soils, 20 percent Falaya soils, and 12 percent Swamp. The rest is Collins soils.

All the soils in this association formed in sediments washed from the uplands of northwestern Tennessee and western Kentucky.

Falaya soils are somewhat poorly drained. Waverly soils are poorly drained. Both are dominantly gray silt loam to

a depth of 5 feet or more. Swamp consists of tracts on which water remains throughout most of the year. It supports only water-tolerant vegetation. Collins soils are moderately well drained.

Nearly all this association is wooded. Bottom-land hardwoods grow on Waverly and Falaya soils. Only bald-cypress and button willow grow well on the swampy tracts. These wet river bottoms are poorly suited to row crops, hay, and pasture. A few cleared fields along the outer edge are planted to soybeans, but crop failures are common. Land holdings are in fairly large tracts. Farms are commonly about 300 acres in size; some are much larger. The Tennessee Game and Fish Commission owns a large tract that is now being developed into a waterfowl refuge and hunting area.

The flooding and standing water make this association attractive to waterfowl but limit its use for other purposes. Even if drainage is improved, most of this association probably will remain an area where production of crops involves high risk and where crop failures are common.

9. *Iberia-Sharkey-Forestdale association*

Poorly drained, level, clayey and loamy soils on the Mississippi River bottoms

This soil association is at the eastern edge of the broad, flat Mississippi River bottoms. It consists mostly of depressions, but there are knolls and ridges that rise 5 to 10 feet higher than the depressions. Water collects on most of this association several times each year, in winter and spring. The floodwater remains for periods ranging from 2 or 3 days to as long as 3 weeks. The ridges and knolls are flooded only during major floods.

This association makes up less than 1 percent of Obion County. It is about 25 percent Iberia soils, 25 percent Sharkey soils, and 25 percent Forestdale soils. The rest is Tiptonville, Commerce, Convent, and Reelfoot soils.

Differences in elevation account for major differences among the soils. Poorly drained soils that formed in clayey sediments are in the depressions. Iberia, Sharkey, and Forestdale soils are in these low areas where water collects. All have a water table that is near the surface throughout most of the winter and spring.

Iberia soils have a surface layer of very dark grayish-brown silty clay loam and a subsoil of dark-gray, plastic clay.

Sharkey soils have a surface layer of very dark grayish-brown plastic clay. Their subsoil is gray and dark-gray, very plastic clay.

Forestdale soils have a surface layer of dark grayish-brown silt loam or silty clay loam. Their subsoil is dominantly grayish-brown silty clay and clay.

Tiptonville soils are moderately well drained. Commerce, Convent, and Reelfoot soils are somewhat poorly drained. All occupy the slightly higher elevations.

Nearly all the association has been cleared. Few, if any, farm homes are in the association. The acreages farmed are parts of farms that extend from the adjoining soil associations.

The excess water and the clayey texture of most soils limit the number of crops that can be grown. In many years floodwater stands until late in spring. In wet years the low part of the association dries out too late to grow cotton and corn. Soybeans is the main crop. There are only

a few spots where drainage and soil aeration are adequate for winter crops, such as small grain, or for long-lived perennials, such as alfalfa.

Descriptions of the Soils

This section describes the soil series and mapping units in Obion County. Each soil series is described in considerable detail, and then, briefly, each mapping unit in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman. The second, detailed and in technical terms, is for scientists, engineers, and others who need to make thorough and precise studies of soils. Unless otherwise stated, the colors and consistence given in the descriptions are for a moist soil.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Gullied land, for example, does not belong to a soil series, but nevertheless, is listed in alphabetic order along with the soil series.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit is the capability unit and woodland group in which the mapping unit has been placed. The page for the description of each mapping unit and each capability unit is shown in the "Guide to Mapping Units" at the back of this survey.

The acreage and proportionate extent of each mapping unit are shown in table 2. Many of the terms used in describing soils can be found in the Glossary at the end of this survey, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (5).

Adler Series

Moderately well drained soils are in the Adler series. They consist of recently deposited sediments that washed from the nearby steep hills. They are on first bottoms along stream channels and the outer edge of the Mississippi River bottoms. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is silt loam about 8 inches thick. Below this layer is several feet of brown, very friable silt loam mottled with gray and brown.

Representative profile of Adler silt loam:

Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, medium, granular structure; very friable; neutral; abrupt, smooth boundary.

C1—8 to 24 inches, brown (10YR 4/3) silt loam; few, fine, faint, yellowish-brown and grayish-brown mottles; massive, but has thin horizontal strata or bedding planes; very friable; common, fine, very dark brown stains; neutral; clear, smooth boundary.

TABLE 2.—Approximate acreage and proportionate extent of soils

Soil	Acres	Percent
Adler silt loam	16,874	4.8
Birds silt loam	1,614	.5
Bowdre silty clay	1,754	.5
Calloway silt loam	14,675	4.2
Center silt loam	6,384	1.8
Collins silt loam	13,601	3.9
Commerce silt loam	1,509	.4
Convent silt loam	16,352	4.6
Dekoven silt loam	4,939	1.4
Falaya silt loam	29,611	8.4
Falaya silt loam, frequently flooded	5,546	1.6
Forestdale silt loam	224	.1
Forestdale silty clay loam	234	.1
Fountain silt loam	5,614	1.6
Grenada silt loam, 2 to 5 percent slopes	20,003	5.7
Grenada silt loam, 2 to 5 percent slopes, eroded	3,849	1.1
Grenada silt loam, 5 to 8 percent slopes	517	.1
Grenada silt loam, 5 to 8 percent slopes, eroded	18,264	5.2
Grenada silt loam, 8 to 12 percent slopes, eroded	6,376	1.8
Gullied land	2,479	.7
Iberia silty clay loam	1,267	.4
Loring silt loam, 2 to 5 percent slopes	9,371	2.7
Loring silt loam, 2 to 5 percent slopes, eroded	809	.2
Loring silt loam, 5 to 8 percent slopes, eroded	2,889	.8
Loring silt loam, 8 to 12 percent slopes	479	.1
Loring silt loam, 8 to 12 percent slopes, eroded	8,940	2.5
Loring silt loam, 12 to 20 percent slopes, eroded	3,485	1.0
Memphis silt loam, 2 to 5 percent slopes	19,965	5.7
Memphis silt loam, 2 to 5 percent slopes, eroded	2,422	.7
Memphis silt loam, 5 to 8 percent slopes	974	.3
Memphis silt loam, 5 to 8 percent slopes, eroded	10,387	2.9
Memphis silt loam, 8 to 12 percent slopes, eroded	3,082	.9
Memphis silt loam, 12 to 20 percent slopes, eroded	6,527	1.8
Memphis silt loam, 20 to 30 percent slopes, eroded	28,039	8.0
Memphis silt loam, 30 to 50 percent slopes	20,528	5.8
Memphis soils-Gullied land complex, 12 to 30 percent slopes	7,016	2.0
Morganfield silt loam	888	.2
Reelfoot silt loam	1,753	.5
Routon silt loam	7,631	2.2
Routon-Bonn silt loams	8,816	2.5
Sharkey clay	1,446	.4
Smoothed land, Memphis soil material	530	.1
Swamp	7,477	2.1
Tiptonville silt loam	893	.2
Waverly silt loam	9,142	2.6
Waverly silt loam, frequently flooded	16,451	4.7
Worthen silt loam	574	.2
Total	352,000	100.0

C2—24 to 36 inches, brown (10YR 4/3) silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; massive, but has thin horizontal strata or bedding planes; very friable; common, fine, dark-brown stains; neutral; clear, smooth boundary.

C3—36 to 60 inches, brown (10YR 5/3) silt loam; common, medium, distinct, gray (10YR 5/1) mottles and few, medium, distinct, strong-brown (7.5YR 5/6) mottles; massive, but has thin horizontal strata or bedding planes; very friable; neutral.

The Ap horizon ranges from 8 to 10 inches in thickness. The C horizon to a depth of about 20 inches is brown and has a few yellowish-brown and grayish-brown mottles. Below a depth of

20 inches, it is grayish brown or brown and has common or many, grayish-brown, gray, or light brownish-gray mottles. Adler soils are neutral or mildly alkaline throughout.

Adler soils are adjacent to Morganfield and Convent soils. They are not so well drained as Morganfield soils, but they are better drained than Convent soils. They are similar to Collins soils but are less acid.

Adler silt loam (Ad).—This moderately well drained, very friable soil is on first bottoms. Slopes are 0 to 2 percent.

Some tracts are flooded or have water standing after rains in winter and early in spring. The water stands for only a few hours on most tracts, but for a day or two on a few.

If drained, this soil is easy to work, is easy to keep in good tilth, and is easily penetrated by roots, water, and air. The available water capacity is high. Plants nearly always have a good supply of moisture.

This fertile soil is naturally high in phosphorus and potassium, but most crops respond well to additions of these elements. Cotton, corn, and other nonlegumes respond well to nitrogen. This soil is neutral to mildly alkaline throughout.

This soil is used mostly for cotton, corn, and soybeans. Except in areas subject to flooding, it is well suited to all crops commonly grown in the county. Vegetable crops are grown on a few tracts. Capability unit I-1; woodland group 104.

Birds Series

The Birds series consists of poorly drained, loamy soils on first bottoms. These soils formed in sediments recently washed from the nearby uplands. They are in all parts of the county in low spots where water collects. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is grayish-brown silt loam about 9 inches thick. Below this is a few feet of gray and grayish-brown, friable silt loam mottled with yellow and brown.

Representative profile of Birds silt loam:

Ap—0 to 9 inches, grayish-brown (10YR 5/2) silt loam; few, medium, faint, light-gray (10YR 7/1) mottles; weak, fine, granular structure; very friable; neutral; abrupt, smooth boundary.

C1g—9 to 30 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; friable; neutral; clear, smooth boundary.

C2g—30 to 60 inches, grayish-brown (2.5Y 5/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; friable; few, medium, black concretions; neutral.

The A horizon ranges from 7 to 10 inches in thickness. It is gray in wooded tracts. The C horizon is predominately mottled gray or grayish brown. In a few places on the Mississippi River bottoms, the sediments range from loam to clay below a depth of about 3 feet. These soils are slightly acid through mildly alkaline.

Birds soils are adjacent to Convent, Routon, and Dekoven soils. They are more poorly drained than Convent soils. They are less clayey in the lower layers than Routon soils. They have a lighter colored surface layer than Dekoven soils. Birds soils resemble Waverly soils but are less acid.

Birds silt loam (Bd).—This poorly drained soil is on first bottoms along streams and on the outer edge of the Mississippi River bottoms. Slopes are generally less than 1 percent but range from 0 to 2 percent. In a few places

below a depth of 3 feet, this soil is underlain by varying textures that range from loam to clay. The water table is at or near the surface during wet periods in winter and spring. Floodwater and standing water, which has run off higher ground, are common on this soil for several days at a time during wet periods.

If drained, this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. The available water capacity is high, and runoff is slow. Plants nearly always have a good supply of moisture.

Corn and most other nonlegumes respond well to nitrogen. Heavy applications on cotton, however, keep the plants green and prevent bolls from opening properly in fall. Most crops respond well to additions of phosphorus and potassium; the content of these elements is medium. The soil is slightly acid through mildly alkaline throughout. No lime is needed.

This soil is suited to soybeans and other summer annuals that can be planted late and to plants that tolerate

wetness, for example, tall fescue and white clover. It is poorly suited to small grain and to alfalfa and other deep-rooted, long-lived perennials that cannot tolerate wetness. Most of the acreage is in soybeans. Capability unit IIIw-3; woodland group 2w6.

Bonn Series

The Bonn series consists of poorly drained soils commonly called "deer licks" and "slickspots" (fig. 6). These soils have a high sodium content. They developed in loess. They are intermingled with Routon soils, generally in areas less than half an acre in size. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is grayish-brown silt loam about 8 inches thick. The upper 20 inches of the subsoil is friable silt loam. It is light gray in the upper part and grayish brown in the lower. Below this,



Figure 6.—Bonn silt loam in small white spots, commonly known as "deer licks."

to a depth of about 50 inches, is gray and light brownish-gray silty clay loam.

Representative profile of Bonn silt loam, in an area of Routon-Bonn silt loams:

- Ap—0 to 8 inches, grayish-brown (2.5Y 5/2) silt loam; few, fine, faint, gray mottles; weak, fine, granular structure; friable; few, hard, black concretions; neutral; abrupt, smooth boundary.
- A2g&Btg—8 to 18 inches, light-gray (10YR 7/1) silt loam; moderate, medium, granular structure; friable; few dark-brown stains; few pockets or seams of grayish-brown (2.5Y 5/2), coarse silty clay loam that form a parabolic or crescent shape; neutral; clear, wavy boundary.
- B21tg—18 to 28 inches, grayish-brown (2.5Y 5/2) silt loam; tongues of light-gray (10YR 7/1) silt extend from the A2g and Btg horizon into this horizon; few, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, coarse, prismatic structure breaking to weak subangular blocky; friable; common clay films on vertical and horizontal ped surfaces; few iron-manganese concretions; moderately alkaline; gradual, smooth boundary.
- B22tg—28 to 40 inches, gray (5Y 5/1) silty clay loam; few, fine, distinct, yellowish-brown mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular blocky; friable, slightly sticky; nearly continuous clay films; moderately alkaline; gradual, smooth boundary.
- B23tg—40 to 50 inches, light brownish-gray (2.5Y 6/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/4) mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular blocky; friable, slightly sticky; nearly continuous gray (5YR 6/1) clay films; moderately alkaline.

The A horizon is slightly acid through neutral. Its total thickness ranges from about 6 to 18 inches. The Ap horizon ranges from 6 to 10 inches in thickness. The B horizon is mildly alkaline or moderately alkaline. The B2g horizon is high in sodium content. The B22tg and B23tg horizons are silty clay loam or silt loam.

The Bonn soils in Obion County are mapped only with Routon soils.

Bowdre Series

The Bowdre series consists of somewhat poorly drained soils that have a dark-colored, clayey surface layer. These soils are in low spots on the Mississippi River bottoms along the western edge of the county. They formed in sediments deposited by floodwater. The surface layer was deposited during periods when the bottoms were ponded. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is very dark grayish-brown, plastic silty clay about 15 inches thick. Below this layer is brown, friable silt loam mottled with gray.

Representative profile of Bowdre silty clay:

- Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay; moderate, medium and fine, granular structure; firm, plastic and sticky; neutral; clear, smooth boundary.
- A1—6 to 15 inches, very dark grayish-brown (10YR 3/2) silty clay; moderate, medium, granular structure; firm, plastic and sticky; neutral; abrupt, smooth boundary.
- IIC1—15 to 19 inches, brown (10YR 4/3) silt loam; common, medium, distinct, grayish-brown (10YR 5/2) mottles; massive; friable; neutral; gradual, smooth boundary.
- IIC2—19 to 50 inches, brown (10YR 4/3) silt loam; common, medium, distinct, gray (10YR 5/1) mottles; massive; friable; neutral; clear, smooth boundary.

The very dark grayish-brown A horizon ranges from 10 to 20 inches in thickness. It is silty clay or clay that is plastic

and sticky when wet and hard when dry. The mottled brown IIC horizon is silt loam, loam, fine sandy loam, or silty clay loam. In some places, it is clay below a depth of about 42 inches. Bowdre soils are slightly acid or neutral throughout the profile.

Bowdre soils are adjacent to Sharkey, Iberia, and Commerce soils. They are less clayey below depths of 10 to 20 inches than Sharkey and Iberia soils. They are more clayey in the upper 10 to 20 inches than Commerce soils. They are better drained than Sharkey and Iberia soils.

Bowdre silty clay (8c).—This soil is somewhat poorly drained. It is in low spots on the Mississippi River bottom along the western edge of Obion County. Slopes are 0 to 2 percent. Below the surface layer is silt loam, loam, fine sandy loam, or silty clay in places in alternate layers. Below a depth of about 3½ feet, the texture ranges from fine sandy loam to clay. Included with this soil in mapping are a few spots where the surface layer is about 24 inches thick.

Water that has run off higher places stands on some tracts for several days at a time during wet periods in winter and spring. Also, during these periods, the water table rises to within a depth of about 20 inches.

The clayey texture makes this soil plastic and sticky when wet and hard when dry; consequently it is difficult to work except when it is moist. When moist, it is fairly easy to work and has good tilth. The soil swells when wet and shrinks as it dries. Shrinkage causes a network of cracks 1 to 3 inches wide in the surface layer. But this soil is in low spots and is seldom dry enough for cracks to form. The high clay content retards the movement of roots, water, and air. The available water capacity is high. Plants nearly always have a good supply of moisture.

This soil is high in phosphorus and potassium, but most crops respond fairly well to additions of these elements. Cotton, corn, and other nonlegumes respond well to nitrogen. This soil is slightly acid or neutral; no lime is needed.

Row crops are grown on much of the acreage. A large part of the acreage in the Reelfoot National Wildlife Refuge is wooded or is used for small grain for waterfowl. The low areas where water collects and stands during wet periods are suited to trees, to pasture grasses, such as tall fescue and white clover that tolerate wetness in winter, and to soybeans and other summer crops that can be planted late. The higher, better drained areas are suited to summer row crops and to small grain. Capability unit IIIw-4; woodland group 2w5.

Calloway Series

The Calloway series consists of poorly drained soils that have a fragipan. These soils developed in loess. They occupy slight knolls and rises on the broad, flat uplands. Slopes are 0 to 3 percent.

In the representative profile, the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil, to a depth of about 24 inches, is yellowish-brown silt loam mottled with gray. A mottled gray and brown fragipan begins at a depth of 24 inches. It is about 20 inches thick. Below the pan is several feet of yellowish-brown, friable silt loam mottled with gray.

Representative profile of Calloway silt loam:

- Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; strongly acid; few medium concretions; abrupt, smooth boundary.

- B2—8 to 18 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint, grayish-brown (10YR 5/2) mottles; weak, medium, subangular blocky structure; friable; common medium concretions; strongly acid; clear, smooth boundary.
- B3—18 to 24 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, faint, grayish-brown (10YR 5/2) mottles; weak, medium, subangular blocky structure; friable; common medium concretions; strongly acid; clear, smooth boundary.
- A'2x—24 to 27 inches, gray (10YR 5/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) and light yellowish-brown (10YR 6/4) mottles; weak, fine, prismatic structure; brittle; friable; common, very dark brown or black concretions; many medium pores; strongly acid; clear, wavy boundary.
- B'x1—27 to 38 inches, yellowish-brown (10YR 5/6) silt loam; many, medium, distinct, gray (10YR 5/1) mottles; weak, medium, prismatic structure, with gray silt coatings, breaking to weak, medium, subangular blocky; firm, brittle; common clay films on vertical and horizontal subangular blocky ped faces; common, medium and fine, very dark brown and black concretions and many black stains; common very fine pores; strongly acid; clear, smooth boundary.
- B'x2—38 to 45 inches, yellowish-brown (10YR 5/6) silt loam; common, medium, distinct, gray (10YR 5/1) and grayish-brown (10YR 5/2) mottles; weak, coarse, prismatic structure breaking to weak, medium, subangular blocky; slightly firm, brittle; few clay films, mostly on vertical subangular blocky ped faces; common, fine, black concretions and stains; common very fine pores; strongly acid; gradual, smooth boundary.
- C—45 to 72 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, grayish-brown (10YR 5/2) and gray (10YR 5/1) mottles; massive; friable; medium acid.

The Ap horizon ranges from 8 to 10 inches in thickness. The fragipan is at a depth of about 18 to 26 inches. It ranges from 18 to about 36 inches in thickness and is silt loam or silty clay loam. The C horizon is brown, yellowish brown, or grayish brown. In unlimed areas, the A and B horizons are strongly acid or medium acid. The C horizon is strongly acid through neutral.

Calloway soils are similar to Center, Routon, and Grenada soils. They differ from Routon and Center soils in having a fragipan. They are better drained than Routon soils, but are more poorly drained from Grenada soils.

Calloway silt loam (Ca).—This soil has a fragipan. It is generally on slightly higher spots in the broad, flat uplands. Smaller spots are near the heads of drains and at the foot of gently sloping hillsides. Slopes are 0 to 3 percent. This soil is somewhat poorly drained. The water table is between depths of 18 and 24 inches during much of the wet period in winter and spring. Included with this soil in mapping are a few spots of poorly drained soils.

This soil has high available water capacity. Most plants ordinarily have a good supply of moisture. Roots, water, and air readily penetrate as far down as the dense, compact pan. The soil becomes excessively wet in the upper part during periods of heavy rainfall. If drained, it is easy to work and to keep in good tilth.

Crops generally respond well to additions of phosphorus and potassium; the content of these elements is medium or low. Most nonlegumes respond well to nitrogen. Large applications, however, keep cotton green and prevent the bolls from opening in fall. In unlimed areas, to a depth of 3 or 4 feet, this soil is medium acid or strongly acid. Lime is needed for most plants.

Mostly row crops, for example, cotton, corn, and soybeans, are grown on this soil. Pasture is grown on a few tracts. Most of the commonly grown summer crops are

suited. Winter crops, for example, small grain, are suited if surface drainage is adequate. Alfalfa and other deep-rooted, long-lived perennials are poorly suited. Capability unit IIIw-1; woodland group 2w5.

Center Series

The Center series consists of somewhat poorly drained, loamy soils. These soils are in the slightly higher parts of the broad, flat uplands. They developed in loess. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is dark grayish-brown silt loam about 8 inches thick. It is underlain by about 6 inches of mottled, pale-brown, friable silt loam. The subsoil, to a depth of about 44 inches, is mottled yellowish-brown, friable silt loam and silty clay loam. Below this is several feet of mottled grayish-brown and yellowish-brown friable silt loam.

Representative profile of Center silt loam:

- Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; a few, fine, faint, gray mottles; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.
- A2—8 to 14 inches, pale-brown (10YR 6/3) silt loam; a few medium, distinct, gray (10YR 5/1) and light olive-brown (2.5Y 5/4) mottles; weak, medium, granular structure; friable; medium acid; clear, smooth boundary.
- B1—14 to 18 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, gray (10YR 5/1) and dark grayish-brown (10YR 4/2) mottles; weak, medium, subangular blocky structure; friable; few clay films; slightly acid; clear, smooth boundary.
- B2t—18 to 39 inches, yellowish-brown (10YR 5/4) silty clay loam; common, medium, distinct, gray (10YR 5/1) and dark grayish-brown (10YR 4/2) mottles; moderate, medium, subangular blocky structure; friable; clay films are common on vertical and few on horizontal ped faces; slightly acid; clear, smooth boundary.
- B3g—39 to 44 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; friable; slightly acid; clear, smooth boundary.
- C1g—44 to 50 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, yellowish-brown (10YR 5/4) mottles; massive; friable; slightly acid; gradual, smooth boundary.
- C2—50 to 72 inches, yellowish-brown (10YR 5/6) silt loam; common, medium, distinct, gray (10YR 5/1) mottles; massive; friable; slightly acid.

The Ap horizon is dark grayish brown or brown. The A2 horizon commonly ranges from 6 to 10 inches in thickness, and in places it is absent. The B2t horizon is silty clay loam or silt loam. The A horizon is medium acid or strongly acid. The B horizon is neutral or slightly acid. The C horizon ranges from slightly acid through mildly alkaline.

Center soils are somewhat similar to Calloway and Routon soils. They do not have a fragipan, which is characteristic of Calloway soils. They are better drained than Routon soils.

Center silt loam (Ce).—This somewhat poorly drained soil is on slight ridges or knolls on the broad, flat uplands. Slopes are 0 to 2 percent. The gray mottles in the upper part of the subsoil and the grayish-brown colors below a depth of 3 feet indicate that this soil is excessively wet during periods of heavy rainfall. During wet periods in winter and spring, the water table rises to within a depth of 2 to 3 feet. Included with this soil in mapping are a few spots of poorly drained soils in depressions.

Plants generally have a good supply of moisture. The available water capacity is high, and little water runs off.

If drained, this soil is easy to work and to keep in good tilth. It is easily penetrated by roots, water, and air.

The content of phosphorus and potassium is medium, but crops respond well to additions of these elements. Most nonlegumes, for example, cotton and corn, respond well to nitrogen. In unlimed areas, this soil is medium acid or strongly acid in the upper 14 to 18 inches. Generally, crops respond well to lime.

Practically all the acreage is used for row crops, hay, or pasture. Most of the crops commonly grown in the county are suited. Capability unit IIw-1; woodland group 2w5.

Collins Series

The Collins series consists of moderately well drained, loamy soils. These soils formed in recent deposits of sediments washed from the nearby uplands. They are on first bottoms, mostly in the eastern half of the county. Slopes are 0 to 2 percent.

In the representative profile, the soil is friable or very friable silt loam to a depth of 60 inches or more. It is brown to a depth of about 20 inches. Below this, it is grayish brown, dark gray, and gray mottled with yellow and brown.

Representative profile of Collins silt loam:

- Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; medium acid; abrupt, smooth boundary.
- C1—8 to 16 inches, brown (10YR 5/3) silt loam; massive, but has thin horizontal strata or bedding planes; very friable; strongly acid; clear, smooth boundary.
- C2—16 to 20 inches, brown (10YR 4/3) silt loam; a few, fine, faint, grayish-brown mottles; massive, but has thin horizontal strata or bedding planes; very friable; strongly acid; clear, smooth boundary.
- C3—20 to 36 inches, grayish-brown (10YR 5/2) silt loam; many, fine, distinct, dark-brown (7.5YR 4/4) mottles; massive, but has thin horizontal strata or bedding planes; friable; strongly acid; clear, smooth boundary.
- C4g—36 to 54 inches, dark-gray (10YR 4/1) silt loam; many, medium, faint, grayish-brown (10YR 5/2) and common, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; friable; strongly acid; clear, smooth boundary.
- C5g—54 to 60 inches, gray (10YR 5/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; massive; friable; strongly acid.

The Ap horizon ranges from 6 to 10 inches in thickness. Reaction is strongly acid throughout. If limed, the surface layer is less acid.

Collins soils are adjacent to Falaya soils and Adler soils. They are better drained than Falaya soils. They are more acid than Adler soils.

Collins silt loam (C).—This is a moderately well drained soil on first bottoms. Slopes are 0 to 2 percent. Floodwater is a hazard nearly every winter and early in spring. Some tracts remain under water for only a few hours, but others are flooded for a day or two. The water table is only 20 to 30 inches below the surface during wet periods.

If drained, this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. The available water capacity is high. Plants nearly always have a good supply of moisture.

This soil is low or medium in phosphorus and potassium content. Crops respond well to additions of these elements.

Nonlegumes respond well to nitrogen. Heavy applications of nitrogen, however, keep cotton plants green and prevent the bolls from opening in fall. Unless limed, this soil is strongly acid throughout. Lime is needed for good crop growth.

In areas where this soil is not subject to flooding, it is suited to all crops commonly grown in the county. It is used mainly for cotton, corn, and soybeans. A few tracts are in pasture. Capability unit I-1; woodland group 1o4.

Commerce Series

The Commerce series consists of somewhat poorly drained soils on the Mississippi River bottoms along the western edge of Obion County. Slopes are 0 to 2 percent. These soils developed in a mixture of sediments from the Mississippi River and the nearby, steep loess hills.

In the representative profile, the surface layer is dark grayish-brown silt loam about 8 inches thick. The subsoil, to a depth of about 30 inches, is mottled, grayish-brown, friable silt loam. It is underlain by several feet of mottled, dark-gray and dark grayish-brown, friable silt loam.

Representative profile of Commerce silt loam:

- Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; neutral; abrupt, smooth boundary.
- B2—8 to 20 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles and few, fine, faint, yellowish-brown mottles; weak, coarse, subangular blocky structure; friable; few, small, black, hard concretions; neutral; clear, smooth boundary.
- B3—20 to 30 inches, grayish-brown (10YR 5/2) silt loam; a few, medium, distinct, dark yellowish-brown (10YR 4/4) mottles and a few, fine, faint, yellowish-brown mottles; weak, coarse, subangular blocky structure; friable; common, small, black concretions; neutral; gradual, smooth boundary.
- A1b—30 to 36 inches, dark-gray (10YR 4/1) silt loam; common, medium, faint dark grayish-brown (10YR 4/2) and distinct yellowish-brown (10YR 5/4) mottles; massive; friable; few, dark-colored hard concretions; neutral; clear, smooth boundary.
- C—36 to 60 inches, dark grayish-brown (10YR 4/2) silt loam; common, medium, faint, gray (10YR 5/1), brown (10YR 4/3), and yellowish-brown (10YR 5/4) mottles; massive; friable; neutral.

The Ap horizon ranges from 8 to 10 inches in thickness. The A1b, B2, and B3 horizons are silt loam or silty clay loam. Some of the silt loam layers approach silty clay loam in clay content. In some areas there is no A1b horizon. The C horizon is commonly silt loam or silty clay loam, but in some areas it ranges from loam through clay. It has dominant colors of dark grayish brown, dark gray, or grayish brown and few to many mottles of yellow, brown, and gray.

Commerce soils are adjacent to Bowdre, Convent, and Iberia soils. They are less clayey in the upper 10 to 20 inches than Bowdre soils. They are more clayey below a depth of 8 inches than Convent soils. They are better drained than Iberia soils and are less clayey below a depth of about 12 inches.

Commerce silt loam (Cm).—This somewhat poorly drained soil is on the Mississippi River bottoms along the western edge of the county. Slopes are 0 to 2 percent. In a few places below a depth of 36 inches, the texture ranges from loam through clay.

Water that has run off higher places and floodwater collect on these tracts during wet periods in winter and spring. It remains for only a few hours on some tracts. On others, it stands for 1 or 2 weeks. The water table is between depths of 10 and 20 inches during much of the

wet period. It drops to a depth of 6 feet or more in summer.

After the excess water drains away, this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily to a depth of 3½ feet or more. Plants generally have a good supply of moisture. The available water capacity is high.

This soil is fertile and is high in phosphorus and potassium content, but many crops respond well to additions of these elements. All crops but legumes respond well to nitrogen. Reaction is neutral throughout. No lime is needed.

Nearly all the acreage is cultivated. Cotton, corn, and soybeans are the main crops. Capability unit IIw-1; woodland group 1w5.

Convent Series

The Convent series consists of loamy, somewhat poorly drained soils on first bottoms. Slopes are 0 to 2 percent. These soils are in all parts of the county. They formed in sediments recently washed from uplands.

In the representative profile, the soil is very friable silt loam to a depth of 50 inches or more. The plow layer is dark grayish brown. Below this, the soil is dark grayish brown, grayish brown, and gray mottled with gray, yellow, and brown.

Representative profile of Convent silt loam:

- Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; very friable; neutral; abrupt, smooth boundary.
- C1—8 to 14 inches, dark grayish-brown (10YR 4/2) silt loam; a few, medium, faint, grayish-brown (10YR 5/2) mottles; weak, medium, granular structure; very friable; neutral; clear, smooth boundary.
- C2—14 to 37 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, gray (10YR 5/1) mottles; massive; very friable; neutral; clear, smooth boundary.
- C3—37 to 50 inches, gray (10YR 5/1) silt loam; common, medium, faint dark grayish-brown (10YR 4/2) and distinct yellowish-brown (10YR 5/4) mottles; massive; very friable; neutral.

The Ap horizon is dark grayish brown or brown. It is 8 to 10 inches thick. The C3 horizon is grayish brown, gray, dark gray, or very dark gray. The texture commonly is silt loam to a depth of 5 feet or more, but in a few places on the Mississippi River bottoms, below a depth of about 3½ feet, there are alternate layers of silt loam, silty clay loam, or clay. These soils are neutral throughout.

Convent soils are adjacent to Adler, Birds, and Commerce soils. They are more poorly drained than Adler soils. They are not so poorly drained as Birds soils. In contrast with Commerce soils, they do not have a B horizon. They are similar to Falaya soils, but are less acid.

Convent silt loam (Cn).—This somewhat poorly drained soil is on first bottoms in low places from which water drains away slowly. Slopes are 0 to 2 percent. The soil is commonly silt loam to a depth of 5 feet or more, but in a few places on the Mississippi River bottom, below a depth of about 3½ feet, there are alternate layers of silt loam, silty clay loam, and clay. During wet periods in winter and spring, the water table rises to within a depth of about 1 foot and remains there for several days at a time. Flood-water or standing water that has run off higher places covers most areas every winter and spring.

This soil has high available water capacity. It provides a good supply of moisture to plants. In drained areas, it is easy to work and to keep in good tilth. Roots, water, and air penetrate easily.

Even though this soil is medium or high in phosphorus and potassium content, crops respond well to additions of these elements. Corn and most other nonlegumes respond well to nitrogen. Heavy applications on cotton, however, keep the plants green and prevent the bolls from opening properly in fall. Reaction is neutral. No lime is needed.

Soybeans is the main crop, but some cotton and corn are grown. All the row crops commonly grown in the county are suited. Fairly large tracts along Reelfoot Lake are wooded, mostly with baldcypress. Capability unit IIw-1; woodland group 1w5.

Dekoven Series

The Dekoven series consists of dark-colored, poorly drained, loamy soils in depressions. Most are on broad flats, but some are on narrow first bottoms. These soils developed in loess and in sediments washed from the nearby hills. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is very dark grayish-brown silt loam about 12 inches thick. The subsoil, to a depth of about 36 inches, is very dark gray or dark-gray silty clay loam. It is underlain by gray, friable silt loam.

Representative profile of Dekoven silt loam:

- Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine and medium, granular structure; friable; neutral; abrupt, smooth boundary.
- A12—6 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; few, fine, distinct, yellowish-brown and gray mottles; weak, coarse, granular structure; friable, except top 2 inches is compact; neutral; clear, smooth boundary.
- B2—12 to 24 inches, very dark gray (10YR 3/1) silty clay loam; moderate, medium, subangular blocky structure; friable; few, thin, patchy clay films; few, fine pores; neutral; clear, smooth boundary.
- B3—24 to 36 inches, dark-gray (5Y 4/1) silty clay loam; few, medium, distinct, light olive-brown (2.5Y 5/4) mottles; weak, medium, subangular blocky structure; friable; neutral; clear, smooth boundary.
- C—36 to 60 inches, gray (5Y 5/1) silt loam; many, coarse, faint, dark-gray (10YR 4/1) mottles; massive; friable; neutral.

The Ap horizon ranges from 6 to 8 inches in thickness. The B horizon is silty clay loam or silt loam. These soils are slightly acid through mildly alkaline in the A horizon. They are neutral or mildly alkaline in the B and C horizons.

Dekoven soils are similar to Fountain, Birds, and Routon soils. They have a darker colored surface layer than any of those soils.

Dekoven silt loam (Dk).—This dark-colored, poorly drained soil is in depressions. Slopes are 0 to 2 percent. The water table is at or near the surface during much of the wet period in winter and spring. It drops to a depth of 6 feet or more in summer and fall. Most tracts have flood-water from nearby streams or runoff from the surrounding hills that remains for a few hours to several days.

After the excess water drains away, the moist soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. The available water capacity is high. Plants nearly always have a good supply of moisture.

This soil is medium in content of phosphorus and potassium, but crops respond well to additions of these elements. Corn and most other nonlegumes respond well to nitrogen. Heavy applications of nitrogen on cotton, however, keep the plants green and the bolls from opening. This soil is slightly acid through mildly alkaline. No lime is needed.

This soil is suited to all the summer row crops commonly grown in the county. It is generally poorly suited to winter crops, such as small grain. Such crops grow well on the higher tracts where surface drainage is good. Capability unit IIw-1; woodland group 1w5.

Falaya Series

The Falaya series consists of somewhat poorly drained, loamy soils on first bottoms. Slopes are 0 to 2 percent. These soils formed in sediments recently washed from the nearby hills.

In the representative profile, the surface layer is dark grayish-brown silt loam about 7 inches thick. Below this layer, to a depth of about 5 feet, is mottled grayish-brown and gray, friable silt loam.

Representative profile of Falaya silt loam:

- Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, faint, gray mottles; weak, medium, granular structure; friable; medium acid; abrupt, smooth boundary.
- C1—7 to 16 inches, grayish-brown (10YR 5/2) silt loam; many, medium, faint, gray (10YR 5/1) mottles and common, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable; few medium concretions; strongly acid; clear, smooth boundary.
- C2—16 to 28 inches, grayish-brown (10YR 5/2) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) and brown (10YR 5/3) mottles; massive; friable; few black stains and few, medium, hard concretions; strongly acid; clear, smooth boundary.
- C3—28 to 43 inches, grayish-brown (10YR 5/2) silt loam; many, coarse, faint, gray (10YR 5/1) mottles and few, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; strongly acid; clear, smooth boundary.
- C4—43 to 60 inches, gray (10YR 4/1) silt loam; massive; friable; common medium concretions; strongly acid.

The A horizon is dark grayish brown or brown. Below a depth of about 40 inches, the C horizon is dominantly gray, grayish brown, or dark gray. Reaction is strongly acid except in limed areas.

Falaya soils are adjacent to Waverly and Collins soils. They are better drained than Waverly soils, but are more poorly drained than Collins soils. They are somewhat similar to Convent soils, but are more acid.

Falaya silt loam (Fc).—This somewhat poorly drained soil is in fairly low spots on first bottoms along smaller streams. Slopes are 0 to 2 percent. This soil has the profile described as representative for the series.

Water collects on this soil and drains away slowly. Also, floodwater from streams covers most areas during wet periods in winter and spring. The water table rises to within a depth of about 1 foot during wet periods.

Falaya silt loam has a high available water capacity. Plants nearly always have a good supply of moisture. After the excess water drains away, this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily if the soil is not too wet.

This soil is low or medium in phosphorus content and low in potassium. All crops suited to this soil respond well to these elements. Practically all nonlegumes respond well to nitrogen. Heavy applications on cotton, however, keep the plants green and prevent the bolls from opening in fall. Unless limed, this soil is strongly acid. All crops respond well to lime.

Cotton, corn, and soybeans are the main crops. A few tracts are used for pasture. All the summer row crops

grown in the county are suited. Generally, small grain and alfalfa and other deep-rooted, long-lived plants are poorly suited. Drainage ditches are needed to remove the excess water. Capability unit IIw-1; woodland group 1w5.

Falaya silt loam, frequently flooded (Fb).—This somewhat poorly drained soil is on first bottoms along the Obion River. Slopes are generally less than 1 percent but range to 2 percent. This soil is flooded during much of the wet period in winter and spring. Floods are so frequent in summer that growing summer annuals is risky. If the soil is not flooded, the water table rises to within a depth of about 1 foot, where it remains for several days to several weeks. The water table then drops to a depth of about 3 or 4 feet and remains there for several months at a time. The soil is grayish silt loam to a depth of 5 feet or more. It is mottled with gray, brown, and yellow.

Plants always have a good supply of moisture, because the available water capacity is high and runoff is very slow. After the excess water drains away, this soil is in good tilth and is easy to work. Roots, water, and air penetrate easily.

This soil is low or medium in phosphorus content and low in potassium. Crops respond only fairly well to additions of these elements because wetness generally shortens the growing season. This soil is strongly acid and requires lime, but lime and fertilizer generally are not used because of the risk and possibility of crop failure.

Practically all the acreage is wooded. Only a few of the highest areas along the outer edge of the Obion River bottom have been cleared. They are used mostly for soybeans. The frequent flooding and wetness make planting row crops risky. Although the possibility of crop failure is great, soybeans and a few other short-season crops make fair yields in the better drained areas. Water oak, white oak, sweetgum, cottonwood, baldcypress, and other trees that tolerate the high water table and frequent flooding grow well. Capability unit VIIw-1; woodland group 1w6.

Forestdale Series

The Forestdale series consists of poorly drained soils that formed in clayey sediments. These soils are on the Mississippi River bottoms along the western edge of the county. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is dark grayish-brown silt loam about 11 inches thick. Below this is about 5 inches of grayish-brown, friable silty clay loam. The subsoil, to a depth of about 40 inches, is mottled light brownish-gray and grayish-brown, plastic silty clay. The underlying material is mottled grayish-brown, plastic clay.

Representative profile of Forestdale silt loam:

- Ap—0 to 11 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; medium acid; clear, smooth boundary.
- A2g—11 to 16 inches, grayish-brown (10YR 5/2) silty clay loam; many, coarse, faint, dark grayish-brown (10YR 4/2) mottles; weak, medium, granular structure; friable; common, fine, black concretions and black stains; strongly acid; clear, smooth boundary.
- B1tg—16 to 20 inches, grayish-brown (2.5Y 5/2) silty clay loam; many, medium, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) mottles; weak, medium, subangular blocky structure; friable, slightly plastic; strongly acid; clear, smooth boundary.
- B2tg—20 to 30 inches, light brownish-gray (2.5Y 6/2) silty clay; few, fine, faint, grayish-brown mottles and com-

mon, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; firm, plastic and sticky; many, small, black concretions; common clay films on vertical and horizontal ped faces; strongly acid; clear, smooth boundary.

B3tg—30 to 40 inches, grayish-brown (10YR 5/2) silty clay; common, fine, distinct, dark-brown mottles; weak medium, subangular blocky structure; firm, plastic and sticky; many, small, black concretions; strongly acid; gradual, smooth boundary.

C1—40 to 48 inches, grayish-brown (10YR 5/2) clay; common, fine, distinct, yellowish-brown mottles; massive; firm, plastic and sticky; strongly acid; clear, smooth boundary.

C2—48 to 72 inches, grayish-brown (10YR 5/2) clay; common, medium, faint, gray (10YR 5/1) and brown (10YR 5/3) mottles; massive; firm, plastic and sticky; strongly acid.

The Ap horizon is silt loam or silty clay loam. It ranges from 6 to 12 inches in thickness. The B2tg and B3tg horizons are silty clay, clay, or silty clay loam that approaches silty clay in clay content. They are plastic and sticky when wet. Unless limed, these soils are strongly acid or medium acid throughout.

Forestdale soils are next to Reelfoot, Convent, and Routon soils. They are more poorly drained, are more acid, and have a more clayey subsoil than Convent and Reelfoot soils. They are more acid than Routon soils and are more clayey, especially below a depth of 10 inches.

Forestdale silt loam (Fd).—This grayish, poorly drained soil is on the Mississippi River bottoms. It has the profile described as representative for the series. Slopes are 0 to 2 percent.

Floodwater from streams is seldom a hazard, but water from the surrounding higher places collects on this soil and stands for a few hours to 1 or 2 days. After the surface water drains away, the soil is generally wet and soggy throughout winter and part of spring because the water table is at or near the surface.

The clayey subsoil retards the movement of water, air, and plant roots. The available water capacity is high, but the retarded root growth below a depth of about 20 inches makes the soil somewhat droughty. After the excess water drains away in spring, the soil is easy to work.

Unless limed, this soil is medium acid or strongly acid throughout. It requires lime for good crop growth. The content of phosphorus and potassium is low, but crops generally respond fairly well to additions of these elements. For nonlegumes, such as cotton and corn, the response to nitrogen is fair to good.

Row crops are the main crops. Summer row crops and pasture are suited. Because of the clayey nature of the subsoil, land grading and smoothing generally are only moderately successful. Capability unit IIIw-2; woodland group 1w6.

Forestdale silty clay loam (Fe).—This is a poorly drained soil on the Mississippi River bottoms. It formed in clayey sediment deposited by the Mississippi River. Slopes are 0 to 2 percent. The plow layer is dark grayish-brown silty clay loam. It is underlain by about 5 inches of grayish-brown or gray silty clay loam. The subsoil is light brownish-gray, gray, or grayish-brown, plastic clay, silty clay, or silty clay loam mottled with yellow, brown, and gray.

Water that has run off surrounding areas collects on this soil. It remains for a few hours to a day or two before it drains away. The soil is wet and soggy, and the water table

is near the surface during winter and early in spring. Floodwater from streams is seldom a hazard.

The plow layer is plastic and sticky when wet, but it is hard when dry. Consequently, this soil is easy to work and has good tilth only when moist. The movement of roots, water, and air is restricted by the clayey subsoil. The available water capacity is high, but the retarded root growth makes this soil somewhat droughty late in summer and early in fall.

This soil is low in phosphorus and potassium content, but most crops respond fairly well to additions of these elements. The response of cotton, corn, and other nonlegumes to nitrogen is fair to good. Heavy applications keep cotton plants green and prevent bolls from opening in fall. Nonlegume pasture plants, such as tall fescue, respond well to nitrogen. Unless limed, this soil is medium acid or strongly acid. Additions of lime are needed for good growth of most plants.

This soil is rather difficult to manage and is used mostly for soybeans. The poor drainage limits the number of crops that grow well. Generally, land grading and smoothing are only moderately successful, probably because of the clayey subsoil. Capability unit IIIw-2; woodland group 1w6.

Fountain Series

The Fountain series consists of poorly drained, loamy soils. These soils developed in loess and in alluvium from the nearby hills. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is silt loam about 12 inches thick. It is dark grayish brown in the upper part and dark gray in the lower part. The subsoil, to a depth of about 32 inches, is also silt loam. It is mottled dark gray and friable. It is underlain by mottled gray, friable silt loam several feet thick.

Representative profile of Fountain silt loam:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A12—7 to 12 inches, dark-gray (10YR 4/1) silt loam; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, granular structure; friable; many fine pores; neutral; clear, smooth boundary.

B2g—12 to 27 inches, dark-gray (10YR 4/1) silt loam; common, medium, distinct, dark-brown (7.5YR 4/4) and dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; friable; clay films on vertical and horizontal ped faces; common fine pores; neutral; clear, smooth boundary.

B3g—27 to 32 inches, dark-gray (10YR 4/1) silt loam; common, medium, distinct dark yellowish-brown (10YR 4/4) and faint gray (10YR 5/1) mottles; weak, coarse, subangular blocky structure; friable; neutral; clear, smooth boundary.

C1—32 to 50 inches, gray (10YR 5/1) silt loam; common, medium, faint brown (10YR 5/3) mottles and distinct light yellowish-brown (10YR 6/4), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/6) mottles; massive; friable; neutral.

C2—50 to 72 inches, mottled gray (10YR 5/1) and strong-brown (7.5YR 5/6) silt loam; massive; friable; neutral.

The Ap horizon ranges from 6 to 10 inches in thickness. The B2tg horizon ranges from about 12 to 20 inches in thickness. The A horizon is slightly acid or neutral. The B and C horizons are neutral or mildly alkaline.

Fountain soils are adjacent to Routon, Dekoven, and Center soils. They are less acid in the upper 2 feet than Routon soils. They are not so dark colored in the upper 2 to 3 feet as Dekoven soils. They are more poorly drained than Center soils.

Fountain silt loam (Fn).—This poorly drained soil is on broad flats. It is mostly in Houser Valley and on the adjacent so called "flat land." Small tracts occur in other parts of the county. Slopes are 0 to 2 percent. Some tracts of this soil are flooded nearly every winter and spring. Other tracts are not flooded, but have standing water for a few hours to a day or two during wet periods in winter and spring. Also, the water table rises to within a few inches of the surface during periods of heavy rainfall.

After the excess water drains away in spring, this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. The available water capacity is high. Plants generally have a good supply of moisture.

This soil is medium in content of phosphorus and potassium. Most plants respond well to additions of these elements. Most nonlegumes respond well to nitrogen. Heavy applications on cotton, however, keep the plants green until late in fall and keep bolls from opening properly. In most areas this soil is slightly acid or neutral in the upper 12 inches and needs no lime. In a few areas along rivers, however, the surface layer is medium acid. Crops in these areas respond well to lime. Below a depth of about 12 inches, this soil is neutral or mildly alkaline.

This soil is suited to most crops grown in the county. Nearly all the acreage is used for row crops, mainly soybeans and corn. Small grain and pasture are grown also. Small grain and other winter crops grow well in areas where there is no flood hazard, but wetness is likely to damage crops in unusually wet years. Capability unit IIIw-3; woodland group 1w6.

Grenada Series

The Grenada series consists of moderately well drained soils. These soils developed in loess deposits 12 to 50 feet thick. They have a fragipan that commonly begins at a depth of about 2 feet. Slopes range from 2 through 12 percent.

In the representative profile, the surface layer is brown silt loam about 8 inches thick. The subsoil, to a depth of about 24 inches, is yellowish-brown, friable silt loam. A fragipan of yellowish-brown and gray, brittle silt loam begins at a depth of about 24 inches and extends to a depth of about 48 inches. Below this is several feet of mottled brown, friable silt loam.

Representative profile of Grenada silt loam, 2 to 5 percent slopes:

- Ap—0 to 8 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; medium acid; abrupt, smooth boundary.
- B2—8 to 21 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; few clay films on vertical ped faces; strongly acid; clear, smooth boundary.
- B3—21 to 24 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, gray (10YR 5/1) mottles; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.
- A'2x—24 to 30 inches, gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, granular structure to massive; somewhat brittle in place but friable in disturbed areas; many medium and fine pores; strongly acid; abrupt, smooth boundary.
- B'x1—30 to 41 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct gray (10YR 5/1) and faint grayish-brown (10YR 5/2) mottles; moderate, me-

dium, prismatic structure, coated with light-gray silt, that breaks to moderate, medium, subangular blocky structure; firm, brittle, and hard when dry; common clay films on vertical and horizontal ped faces; light-gray silt in vertical seams and cracks; strongly acid; clear, smooth boundary.

- B'x2—41 to 48 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, gray (10YR 5/1) and grayish brown (10YR 5/2) mottles; weak, medium, subangular blocky structure; slightly firm, slightly brittle; strongly acid; clear, smooth boundary.
- C—48 to 72 inches, brown (10YR 5/3) silt loam; few, medium, faint, grayish-brown (10YR 5/2) mottles; friable; strongly acid.

The Ap horizon is brown or yellowish brown. It ranges from 6 to 8 inches in thickness and is very friable or friable. In wooded tracts the A1 horizon is very dark grayish brown and 1 to 3 inches thick. The A2 horizon is brown and about 7 inches thick. Depth to the fragipan ranges from 14 to 34 inches. The pan is silt loam or silty clay loam 18 to 36 inches thick. The C horizon is brown, yellowish brown, or grayish brown. In unlimed areas, these soils are strongly acid or medium acid above the fragipan. They are strongly acid in the pan. The C horizon is strongly acid or medium acid to a depth of 6 feet or more.

Grenada soils are adjacent to Loring and Calloway soils. They have a more strongly developed fragipan than Loring soils. They are better drained than Calloway soils.

Grenada silt loam, 2 to 5 percent slopes (GrB).—This moderately well drained soil is mostly on ridgetops. Some tracts are on low upland benches adjacent to bottom land along the larger streams. This soil has the profile described as representative for the series. The surface layer is 6 to 8 inches thick.

This soil has medium to high available water capacity and loses little water through runoff. Most plants ordinarily have a good supply of moisture. Roots, water, and air easily penetrate as far down as the fragipan. The soil is excessively wet during periods of heavy rainfall. After the excess water drains away, it is easy to work and to keep in good tilth.

This soil is low or medium in phosphorus content and low in potassium. Crops suited to the soil respond well to additions of these elements. Unless limed, this soil is medium acid or strongly acid in the upper 2 feet. All crops respond well to lime. Most nonlegumes, such as cotton and corn, respond well to nitrogen.

Row crops are grown on nearly all the acreage. Most of the crops grown in the county are suited. Capability unit IIe-2; woodland group 3o7.

Grenada silt loam, 2 to 5 percent slopes, eroded (GrB2).—This moderately well drained soil is on ridgetops and hillsides. The 6-inch plow layer is brown silt loam. The subsoil, to a depth of about 20 inches, is yellowish-brown, friable silt loam. A dense, compact fragipan begins at a depth of about 20 inches. It ranges from 2 to 3 feet in thickness. The pan is yellowish-brown and gray silt loam or silty clay loam. It is underlain by several feet of brown, yellowish-brown, or grayish-brown, friable silt loam. In spots the yellowish-brown former subsoil is exposed.

Most plants have a good supply of moisture if runoff is controlled. The available water capacity is medium. Because of the dense, compact fragipan, the upper 20 inches is excessively wet during periods of heavy rainfall but is easily penetrated by roots, water, and air. After the excess water drains away, the soil is easy to work and to keep in good tilth.

This soil is low or medium in phosphorus content and low in potassium. Crops suited to the soil nearly always

respond well to these elements. Nonlegumes, such as cotton and corn, respond well to nitrogen. Unless limed, this soil is medium acid or strongly acid in the upper 20 inches. Lime is needed for good crop growth.

This soil is suited to most of the crops commonly grown in the county. It is used mostly for summer row crops. Capability unit IIIe-2; woodland group 3o7.

Grenada silt loam, 5 to 8 percent slopes (GrC).—This moderately well drained soil generally occupies short, wooded hillsides. The 10-inch surface layer is generally brown silt loam that has dark-colored stain of decayed leaves in the upper 3 inches. In a few tracts the plow layer is brown, friable silt loam 8 inches thick. The subsoil, to a depth of about 2 feet, is yellowish-brown, friable silt loam. A fragipan begins at a depth of about 2 feet. It is yellowish-brown and gray silt loam or silty clay loam 1 to 3 feet thick. Below this is several feet of brown or yellowish-brown, friable silt loam.

This soil has medium available water capacity. If runoff is controlled, it provides a good supply of moisture to plants. This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate as far down as the pan.

This soil is low or medium in phosphorus content and low in potassium. Most crops respond well to additions of these elements. Cotton, corn, and other nonlegumes respond well to nitrogen. Unless limed, this soil is medium acid or strongly acid. All crops respond well to lime.

This soil is suited to most of the crops commonly grown in the county. Most of the acreage is wooded. Capability unit IIIe-2; woodland group 3o7.

Grenada silt loam, 5 to 8 percent slopes, eroded (GrC2).—This moderately well drained soil is on hillsides. The 6-inch plow layer is brown or yellowish-brown silt loam. The subsoil, to a depth of about 20 inches, is friable, yellowish-brown silt loam. It is underlain by a fragipan of yellowish-brown and gray silt loam or silty clay loam 2 to 3 feet thick. Below the pan is several feet of brown or yellowish-brown, friable silt loam. A few small gullies have formed.

This soil has medium available water capacity, but the limited space for root growth and the large amount of runoff make it droughty in summer and fall. The soil is easy to work and to keep in good tilth.

This soil is low or medium in phosphorus content and low in potassium. Most crops respond well to additions of these elements. Nonlegume pasture plants, such as tall fescue and bermudagrass, respond well to nitrogen, but cotton, corn, and other nonlegume row crops respond fairly well. Unless limed, this soil is medium acid or strongly acid. Plants generally respond to lime.

This soil is suited to row crops, hay crops, and pasture. It is poorly suited to deep-rooted plants, such as alfalfa. Runoff is difficult to control. Capability unit IVe-2; woodland group 3o7.

Grenada silt loam, 8 to 12 percent slopes, eroded (GrD2).—This moderately well drained soil occupies hillsides. Erosion has removed much of the original surface soil. The present 6-inch plow layer, which is mostly material from the former subsoil, is brown or yellowish-brown silt loam. The yellowish-brown, friable silt loam subsoil extends to a depth of 20 inches. Below this is a yellowish-brown and gray silt loam or silty clay loam fragipan 2 to about 3 feet thick. The pan is underlain by several feet of

brown or yellowish-brown, friable silt loam. In spots the pan is directly below the plow layer. A few gullies have formed.

Roots, water, and air easily penetrate as far down as the fragipan. During periods of heavy rainfall, the upper part is excessively wet and runoff is rapid. The available water capacity is medium, but the limited root growth and high runoff make this soil droughty during dry periods. The soil is fairly easy to work and to keep in good tilth after it dries out in spring.

Even though the content of phosphorus and potassium is low, many crops respond only fairly well to additions of these elements. A few plants respond well. They are plants, such as tall fescue and white clover, that grow when moisture is plentiful. Most nonlegumes, such as cotton and corn, respond only fairly well to nitrogen, but tall fescue, bermudagrass, and other nonlegumes that grow when rainfall is plentiful respond well to nitrogen. Unless limed, this soil is medium acid or strongly acid. Pasture and hay crops respond well to lime.

Because runoff is rapid and the root zone is limited, this soil is poorly suited to row crops and most other summer crops. Hay crops, pasture grasses, and a few row crops are grown. Capability unit VIe-2; woodland group 3o7.

Gullied Land

Gullied land (Gu) consists of some tracts that are cut by numerous gullies and others that are entirely gullied. In some, the gullies form a network of narrow drainage-ways 6 to 15 feet deep. In others, there are 15- to 40-foot holes, commonly called "bully holes," the sides of which are nearly vertical. Slopes range from about 12 to 30 percent.

Gullies have cut through brown or dark-brown, friable silt loam down into Coastal Plain deposits that are a mixture of varying colors of clay and sand. In a few places the bottoms of the gullies are covered with gravel. Memphis soils occupy areas between the gullies. They are brown or dark-brown silt loam to a depth of several feet.

Reclaimed areas of Gullied land can be used for pasture. Some areas can be reclaimed at modest cost, and others at high cost. Areas that have not been reclaimed are best suited to trees. Trees alone, however, do not stabilize the deep, caving gullies. Capability unit VIIe-2; no woodland group.

Iberia Series

The Iberia series consists of poorly drained soils in low narrow strips along the Mississippi River. Slopes are 0 to 2 percent. These soils formed in clayey sediments deposited during periods when the bottoms were ponded.

In the representative profile, the surface layer is very dark grayish-brown and very dark gray silty clay loam 12 inches thick. It is plastic and sticky when wet. The subsoil, to a depth of 60 inches or more, is dark-gray, plastic clay mottled with brown and yellow.

Representative profile of Iberia silty clay loam:

Ap—0 to 6 inches, very dark grayish-brown (10YR 3/2) silty clay loam; moderate, medium, granular structure; firm, plastic and sticky; neutral; abrupt, smooth boundary.

A12—6 to 12 inches, very dark gray (10YR 3/1) silty clay loam; few, fine, distinct, strong-brown mottles; mod-

erate, medium, angular blocky structure; firm, plastic and sticky; neutral; clear, smooth boundary.

B2g—12 to 25 inches, dark-gray (10YR 4/1) clay; common, medium, distinct, dark-brown (7.5YR 4/4) mottles; moderate, medium, subangular blocky structure or massive; very firm, plastic and sticky; few vertical slickensides; neutral; clear, smooth boundary.

B3g—25 to 60 inches, dark-gray (10YR 4/1) clay; common, medium, distinct, dark-brown (7.5YR 4/4) and yellowish-brown (10YR 5/4) mottles; weak, coarse, subangular blocky structure; very firm, plastic and sticky; neutral.

The Ap horizon ranges from 6 to 8 inches in thickness. The B horizon is dark-gray or gray clay to a depth of 40 inches or more. Below a depth of 40 inches, the texture is commonly clay but ranges from clay to fine sandy loam. These soils are plastic and sticky when wet and hard when dry. The A horizon is neutral. The B horizon is neutral or mildly alkaline.

Iberia soils are adjacent to Sharkey, Bowdre, and Commerce soils. They have less clay in the upper 10 to 20 inches than Sharkey soils. They are more poorly drained than Bowdre and Commerce soils.

Iberia silty clay loam (le).—This dark-colored, poorly drained, plastic soil is in low spots on the Mississippi River bottoms, along the western edge of the county. In a few places, loamy sediments are within depths of less than 40 inches. Slopes are 0 to 2 percent.

Most areas collect water from the higher, surrounding areas. In some places the water remains for only a few hours, but in a few it stands for a week or two. The water table rises to within a depth of a few inches and remains there during most of the winter and spring. In summer it drops to a depth of 5 feet or more.

This soil is difficult to work because it is sticky and plastic when wet. It is easy to work and is in fairly good tilth when it is moist or slightly dry. It swells when wet and shrinks as it dries. Cracks 1 to 2 inches wide form at the surface when the soil is dry and extend to a depth of 24 inches. In some areas, however, the soil is seldom dry enough for cracks to form. Plants generally have a good supply of moisture. The available water capacity is high. The clayey subsoil retards movement of roots, water, and air.

This fertile soil is neutral in the upper 10 to 20 inches and is neutral or mildly alkaline below. No lime is needed. The content of phosphorus and potassium is high. The response to additions of these elements is fair to good. Most nonlegumes, such as cotton, corn, and tall fescue, respond well to nitrogen. Too much nitrogen on cotton, however, keeps plants green and prevents bolls from opening in fall.

Most of the acreage is used for row crops, mainly soybeans. A few tracts are wooded. Generally summer row crops are suited, but small grain and other winter crops are poorly suited. A few tracts near the water level of Reelfoot Lake are poorly suited to row crops, hay, or pasture. They are suited to water-tolerant trees, such as baldcypress, water tupelo, and water oak, and to food and cover for wildlife, especially waterfowl. Capability unit IIIw-2; woodland group 2w6.

Loring Series

The Loring series consists of moderately well drained, loamy soils that have a fragipan. These soils have slopes of 2 to 20 percent. They developed in loess deposits about 12 feet to 50 feet thick.

In the representative profile, the surface layer is brown silt loam about 7 inches thick. The subsoil, to a depth of about 32 inches, is dark-brown and dark yellowish-brown, friable silt loam. A fragipan begins at a depth of about 32 inches. It is mottled brown silt loam about 14 inches thick. Below the pan is several feet of yellowish-brown, friable silt loam.

Representative profile of Loring silt loam, 2 to 5 percent slopes:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; friable; strongly acid; abrupt, smooth boundary.

B1—7 to 13 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B21t—13 to 21 inches, dark-brown (7.5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; common clay films; strongly acid; clear, smooth boundary.

B22t—21 to 28 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; few clay films; strongly acid; clear, smooth boundary.

B3—28 to 32 inches, dark yellowish-brown (10YR 4/4) silt loam; common, medium, faint, brown (10YR 5/3) mottles; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

Bx—32 to 46 inches, brown (10YR 4/3) silt loam; many, coarse, faint yellowish-brown (10YR 5/4) and distinct light brownish-gray (10YR 6/2) and gray (10YR 6/1) mottles; moderate, medium, subangular blocky structure; firm and hard in place, but friable when disturbed; common clay films; common medium pores; strongly acid; clear, smooth boundary.

C—46 to 72 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles; massive; friable; strongly acid.

The Ap horizon is brown or dark brown and ranges from 6 to 8 inches in thickness. In wooded areas, the A horizon consists of a very dark grayish-brown A1 horizon about 3 inches thick and a brown A2 horizon about 7 inches thick. The combined thickness of the A1 and A2 horizons ranges from 6 to 10 inches. The B1 and B21t horizons are silt loam or silty clay loam. The B1 horizon is absent in some places. Depth to the fragipan depends mainly on the extent of past erosion and ranges from 16 to 36 inches. In unlimed areas, the soil material above the pan is strongly acid or medium acid. The pan is strongly acid. The C horizon is strongly acid through slightly acid.

Loring soils are next to Memphis and Grenada soils. They have a weak fragipan, which is lacking in Memphis soils. They have a more weakly developed fragipan than Grenada soils.

Loring silt loam, 2 to 5 percent slopes (loB).—This moderately well drained soil is on ridgetops. It has the profile described as representative for the series. The surface layer is 6 to 8 inches thick. The fragipan begins at a depth of about 30 inches.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate as far down as the pan. The available water capacity is high. Plants generally have a good supply of moisture if runoff is controlled.

This soil is medium in content of phosphorus and potassium. In unlimed areas, it is strongly acid or medium acid in the upper 2 to 3 feet. Most crops respond well to additions of phosphorus, potassium, and lime. Cotton, corn, and other nonlegumes respond well to nitrogen.

This soil is used mainly for row crops but is suited to all crops commonly grown in the county. Runoff is the main limitation. Because this soil is gently sloping and moderately well drained, it is among the preferred building sites. Capability unit IIE-1; woodland group 3o7.

Loring silt loam, 2 to 5 percent slopes, eroded (loB2).—This moderately well drained soil is on ridgetops and short hillsides. The 6-inch plow layer is brown silt loam. The subsoil, to a depth of about 2 feet, is dark-brown or dark yellowish-brown, friable silt loam or silty clay loam. A weak fragipan begins at a depth of about 2 feet. The pan is brown silt loam mottled with yellowish brown and gray and is 12 to 18 inches thick. Below the pan is several feet of brown or yellowish-brown, friable silt loam. A few rills and shallow gullies have formed.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate the upper 2 feet. The available water capacity is high. Plants generally have a good supply of moisture if runoff is controlled.

Crops generally respond well to additions of phosphorus and potassium, the content of which is medium. Nonlegumes, such as cotton and corn, respond well to nitrogen. In unlimed areas, this soil is medium acid or strongly acid in the upper 2 feet. All crops respond well to lime.

This soil is used mostly for row crops but is suited to all crops commonly grown in the county. Controlling runoff is the main concern. This soil is among the preferred building sites. Capability unit IIIe-1; woodland group 3o7.

Loring silt loam, 5 to 8 percent slopes, eroded (loC2).—This moderately well drained soil is mostly on the sides of low lying hills. A few tracts are on narrow ridgetops. The 6-inch plow layer consists mostly of former subsoil material. It is brown silt loam. The subsoil, to a depth of 18 to 24 inches, is dark-brown or dark yellowish-brown, friable silt loam or silty clay loam. Below the subsoil is a weak fragipan. The pan is 12 to 18 inches thick and is brown silt loam mottled with yellowish brown and gray. Below the pan is brown or yellowish-brown, friable silt loam several feet thick. In spots the pan is directly below the plow layer. A few small gullies have formed.

This soil is fairly easy to work and to keep in good tilth. Roots, water, and air easily penetrate as far down as the pan. The available water capacity is high. If runoff is controlled, plants ordinarily have a good supply of moisture.

This soil is medium in content of phosphorus and potassium. Crops respond well to additions of these elements. Nonlegumes, such as cotton and corn, respond well to nitrogen. All crops respond well to lime. Unless limed, this soil is medium acid or strongly acid in the upper 18 to 24 inches.

This soil is suited to all the crops commonly grown in the county. It is used for row crops, pasture, and hay crops (fig. 7). Controlling erosion is the main concern. This soil is suitable for building sites. Capability unit IIIe-1; woodland group 3o7.

Loring silt loam, 8 to 12 percent slopes (loD).—This moderately well drained soil is on wooded hillsides. The surface layer is 7 to 10 inches thick. It is brown silt loam that has the dark stain of decayed leaves in the upper 3 inches. The subsoil, to a depth of about 3 feet, is dark-brown or dark yellowish-brown, friable silt loam or silty clay loam. Below the subsoil is a weak fragipan. The pan is brown silt loam mottled with yellowish brown and gray. It is 12 to 18 inches thick. Below the pan is brown or yellowish-brown, friable silt loam several feet thick. A few cleared spots have a 6-inch plow layer of brown silt loam.

The upper 30 inches of this soil can be penetrated easily by roots, water, and air. The available water capacity is high. If runoff is controlled, plants ordinarily have a good supply of moisture.

Unless limed, this soil is medium acid or strongly acid in the upper 2 to 3 feet. It is medium in content of phosphorus and potassium. In cleared spots, crops respond well to additions of these elements and to lime if runoff is controlled.

Most of the acreage is wooded. This soil is suited to pasture and hay crops but is poorly suited to row crops because it erodes easily. Capability unit IVe-1; woodland group 3o7.

Loring silt loam, 8 to 12 percent slopes, eroded (loD2).—This moderately well drained soil is on hillsides. The plow layer is brown silt loam about 6 inches thick. It is mostly former subsoil material. The subsoil, to a depth of 16 to 20 inches, is dark yellowish-brown, friable silt loam. Below this is a weak fragipan that in spots is directly below the plow layer. The pan is brown silt loam mottled with yellowish brown and gray and is 12 to 18 inches thick. Below the pan is brown or yellowish-brown, friable silt loam several feet thick. A few small gullies have formed.

Generally this soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily as far down as the pan. Small gullies make some tracts difficult to work. If runoff is controlled, plants have a good supply of moisture. The available water capacity is high.

In unlimed areas, this soil is medium acid or strongly acid in the upper 2 or 3 feet. The content of phosphorus and potassium is medium. Both pasture and hay plants respond well to additions of these elements and to lime. Nonlegumes, such as bermudagrass and tall fescue, respond well to nitrogen.

Row crops, hay, and pasture are grown. This soil is suited to pasture and hay crops but is poorly suited to row crops because of the erosion hazard. Capability unit IVe-1; woodland group 3o7.

Loring silt loam, 12 to 20 percent slopes, eroded (loE2).—This moderately well drained soil is on hillsides. The surface layer is mostly former subsoil material. It is brown silt loam 6 inches thick. The subsoil, to a depth of about 18 to 20 inches, is dark yellowish-brown, friable silt loam. Below the subsoil is a weak fragipan. The pan is directly below the plow layer in spots. It is brown silt loam mottled with yellowish brown and gray and is 12 to 18 inches thick. It is underlain by several feet of brown or yellowish-brown, friable silt loam. A few small gullies have formed.

This soil has high available water capacity. It provides a good supply of moisture for plants if runoff is controlled. Roots, water, and air easily penetrate to a depth of 16 to 20 inches.

This soil is medium in content of phosphorus and potassium. Pasture and hay crops respond well to both these elements and to lime. Unless limed, the soil is medium acid or strongly acid in the upper 2 to 3 feet. Grasses, such as tall fescue and bermudagrass, respond well to nitrogen.

Most of the acreage is wild pasture. A few areas are used for hay and row crops. This soil is well suited to all the commonly grown pasture and hay crops. It is poorly suited to row crops because it is moderately steep. Capability unit VIe-1; woodland group 3o7.



Figure 7.—Pastured area on Loring silt loam, 5 to 8 percent slopes, eroded.

Memphis Series

The Memphis series consists of well-drained soils that developed in loess. The loess deposits are commonly 12 to 50 feet thick, but range from only 4 feet to about 80 feet. These soils are on uplands. Slopes range from 2 to 50 percent.

In the representative profile, the surface layer is brown silt loam about 6 inches thick. The subsoil, to a depth of about 44 inches, is dark-brown and brown, friable silt loam and silty clay loam. Below this is brown, friable silt loam several feet thick.

Representative profile of Memphis silt loam, 2 to 5 percent slopes:

- Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; strongly acid; abrupt, smooth boundary.
- B1—6 to 14 inches, dark-brown (7.5YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B2t—14 to 29 inches, dark-brown (7.5YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; common clay films on vertical and horizontal ped faces; strongly acid; clear, smooth boundary.

B3—29 to 44 inches, brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable; few clay films, mostly on vertical ped faces; strongly acid; clear, smooth boundary.

C—44 to 72 inches, brown (10YR 4/3) silt loam; a few, fine, distinct, gray or grayish-brown mottles; massive; friable; strongly acid.

The Ap horizon ranges from 6 to 10 inches in thickness. It is brown or dark brown. In wooded tracts the A horizon consists of a very dark grayish-brown A1 horizon 1 to 3 inches thick and a brown A2 horizon 5 to 8 inches thick. The B horizon is dark brown or brown and ranges from 30 to 42 inches in thickness. The B1 and B2t horizons are silt loam or silty clay loam, but in some places the texture is silt below a depth of about 48 inches. The C horizon is brown or dark brown to a depth of 48 inches. Below this depth, it is brown or grayish brown. In unlimed areas, Memphis soils are medium acid through strongly acid in the upper 48 inches. Below this depth, they are strongly acid through neutral.

Memphis soils are generally adjacent to Loring soils. They lack the fragipan that is characteristic of Loring soils.

Memphis silt loam, 2 to 5 percent slopes (MfB).—This well-drained soil is on scattered ridgetops throughout the county. It has the profile described as representative for the series. The surface layer is 6 to 10 inches thick.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. The available water capacity is high. Thus, plants nearly always have a good supply of moisture if runoff is controlled.

Unless limed, this soil is medium acid or strongly acid. Lime is needed in the upper 4 feet for good crop growth. The content of phosphorus and potassium is high to medium, but most crops respond well to additions of these elements. Nonlegumes like cotton and corn respond well to nitrogen.

This soil is well suited to all crops suited to the climate. Nearly all the acreage is used for row crops. Controlling runoff is the main concern. This is one of the preferred soils for building sites and for farming because it is well drained and gently sloping. Capability unit IIe-1; woodland group 2o7.

Memphis silt loam, 2 to 5 percent slopes, eroded (MfB2).—This is a well-drained soil on scattered ridgetops and short hillsides. The 6-inch plow layer is brown silt loam. It is underlain by about 3 feet of dark-brown or brown, friable silt loam or silty clay loam. Below this is brown, friable silt loam several feet thick.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate to great depths. Crops ordinarily have a good supply of moisture if runoff is controlled. The available water capacity is high.

In unlimed areas, this soil is medium acid or strongly acid. All crops respond well to lime. Most crops respond well to additions of phosphorus and potassium, even though the content of these elements is high or medium. Nonlegumes, such as cotton and corn, respond well to nitrogen.

This soil is well suited to all the crops commonly grown in the county. Most of the acreage is used for row crops. Controlling runoff is the main concern. This is one of the preferred soils for farming and for building sites because it is gently sloping and well drained. Capability unit IIe-1; woodland group 2o7.

Memphis silt loam, 5 to 8 percent slopes (MfC).—This well-drained soil is mostly on narrow, winding ridgetops. The surface layer is brown silt loam about 10 inches thick. It commonly has a dark stain from decayed leaves in the upper 3 inches. The subsoil is dark-brown or brown, friable silt loam or silty clay loam. It extends to a depth of nearly 4 feet and is underlain by brown, friable silt loam.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate to great depths. The available water capacity is high. If runoff is controlled, the moisture supply is commonly adequate for most crops.

In unlimed areas, the soil is medium acid or strongly acid. Nearly all crops respond well to lime. They also respond well to phosphorus and potassium, even though the content of these elements is medium or high. Nonlegumes, such as cotton, corn, and tall fescue, respond well to nitrogen.

This soil is suited to all crops commonly grown in the county but generally is not used for row crops or pasture because the areas are small, narrow and irregular, and

between steep hillsides. Most ridgetops are wooded; a few have been cleared. Capability unit IIIe-1; woodland group 2o7.

Memphis silt loam, 5 to 8 percent slopes, eroded (MfC2).—This well-drained soil is on narrow ridgetops and short hillsides. The 6-inch plow layer is brown or dark-brown silt loam. It is mostly former subsoil material that has been mixed with the remaining original surface layer. The subsoil, to a depth of nearly 4 feet, is commonly dark-brown, friable silt loam. In places it is silty clay loam in the upper 1 foot. Below a depth of about 4 feet is a layer of brown, friable silt loam several feet thick. A few gullies, generally less than 3 feet deep, have formed.

This soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate to great depths. If runoff is controlled, crops have a good supply of moisture. The available water capacity is high.

This soil is high or medium in content of phosphorus and potassium, but most plants respond well to additions of these elements. Nonlegumes, such as tall fescue, cotton, and corn, respond well to nitrogen. All crops respond well to lime. Unless limed, this soil is medium acid or strongly acid.

This soil is suited to all crops commonly grown in the county. It is used for row crops, hay, and pasture. Controlling runoff is the main concern. Capability unit IIIe-1; woodland group 2o7.

Memphis silt loam, 8 to 12 percent slopes, eroded (MfD2).—This well-drained soil is on hillsides. Erosion has removed much of the original surface layer. The 6-inch plow layer is a mixture of the remaining surface soil and former subsoil material. It is brown or dark-brown silt loam 6 inches thick. The subsoil, to a depth of about 4 feet, is dark-brown or brown, friable silt loam. It is underlain by brown, friable silt loam several feet thick. Included in mapping are a few wooded spots where the surface layer is friable silt loam 10 inches thick and is stained with decayed leaves in the upper 3 inches. A few small gullies have formed.

This Memphis soil is fairly easy to work and to keep in good tilth. It has high available water capacity and provides a good supply of moisture to plants if runoff is controlled. Roots, water, and air penetrate easily.

The content of phosphorus and potassium is medium or high, but crops generally respond well to additions of these elements. Nonlegumes, such as tall fescue, respond well to nitrogen. Most crops, especially pasture and hay crops, respond well to lime. Unless limed, the soil is medium acid or strongly acid.

This soil is used for hay, pasture, and row crops. It is suited to all the commonly grown hay and pasture plants, but the strong slopes make it poorly suited to row crops. Capability unit IVe-1; woodland group 2o7.

Memphis silt loam, 12 to 20 percent slopes, eroded (MfE2).—This well-drained soil has a plow layer of brown or dark-brown silt loam about 6 inches thick. The subsoil, to a depth of 3 to 4 feet, is dark-brown or brown, friable silt loam. Below this depth is brown or grayish-brown, friable silt loam. A few gullies have formed.

This soil has high available water capacity. It provides a good supply of moisture to plants if runoff is controlled. Roots, water, and air penetrate to great depths. Because of the moderate slopes, the soil is fairly difficult to work. It is fairly easy to keep in good tilth.

The content of phosphorus and potassium is medium or high, but most pasture and hay plants respond well to additions of these elements. Nonlegumes, such as tall fescue, respond well to additions of nitrogen. Unless limed, this soil is strongly acid or medium acid in the upper 4 feet. Below this depth, it is strongly acid through neutral. A few eroded spots are neutral at or near the surface. These spots do not need lime. Lime is needed for most pasture and hay crops.

Most of the acreage is used for pasture, mostly wild grasses and legumes. Most of the pasture and hay plants commonly grown in the county grow well on this soil. Row crops are poorly suited. Runoff is rapid, and the soil erodes easily. Capability unit VIe-1; woodland group 2o7.

Memphis silt loam, 20 to 30 percent slopes, eroded (M(F2).—This well-drained soil is on hillsides. The surface layer is brown silt loam about 6 inches thick. In wooded tracts it has the dark stain of decayed leaves in the upper

3 to 5 inches. The subsoil, to a depth of about 3 or 4 feet, is dark-brown or brown, friable silt loam. A few gullies have formed.

This soil is easy to keep in good tilth, but the steep slopes make it difficult to work. If runoff is controlled, it provides a good supply of moisture to plants. The available water capacity is high. Roots, water, and air easily penetrate to a great depth.

The content of phosphorus and potassium is medium or high. Most pasture plants respond well to additions of these elements. Nonlegumes, such as tall fescue, respond well to nitrogen. Lime is needed for most pasture and hay crops. In unlimed areas, the upper 4 feet is commonly medium acid or strongly acid. No lime is needed in spots where the soil is neutral.

This soil is suited to pasture (fig. 8). Wild grasses and legumes are the main pasture crops. Capability unit VIe-1; woodland group 2r8.



Figure 8.—Farm pond on Memphis silt loam, 20 to 30 percent slopes, eroded. White clover and tall fescue grow well.

Memphis silt loam, 30 to 50 percent slopes (MfG).—

This well-drained soil is on long hillsides that form deep, narrow, meandering V-shaped valleys. The surface layer is brown silt loam about 10 inches thick. It has the dark stain of decayed leaves in the upper 2 or 3 inches. The subsoil, to a depth of 3 or about 4 feet, is dark-brown or brown, friable silt loam or silty clay loam. Below this is brown or grayish-brown, friable silt loam or silt. A few gullies have formed. In spots on hillsides, the soil is brown or grayish-brown, very friable silt or silt loam several feet thick.

This soil has high available water capacity and provides a good supply of moisture to plants if runoff is controlled. Roots, water, and air easily penetrate to great depths. The steep slopes make the use of modern farm equipment practically impossible.

The content of phosphorus and potassium is high or medium. The soil is commonly medium acid or strongly acid in the upper 3 or 4 feet. In spots it is neutral. Below a depth of about 4 feet, it is slightly acid through neutral.

This soil is suited to many kinds of hardwoods. It is poorly suited to pasture or row crops. Capability unit VIIe-1; woodland group 2r8.

Memphis soils-Gullied land complex, 12 to 30 percent slopes (MgF).—This mapping unit occupies hillsides, mostly in the western part of the county. A network of gullies 3 to 6 feet deep have formed. Memphis soils are between the gullies. Erosion has removed most of the original surface layer. The 6-inch plow layer, consisting mostly of former subsoil material, is dark-brown or brown silt loam or silty clay loam. The subsoil, to a depth of about 3 feet, is dark-brown, friable silt loam. Below this is brown, very friable silt loam several feet thick.

Roots, water, and air penetrate to great depths. The soils have high available water capacity but are droughty in summer and fall. Runoff is rapid and difficult to control. Gullies make the use of modern farm machinery nearly impossible.

These soils are medium acid or strongly acid in the upper 4 feet. Below this they are strongly acid to neutral.

Gullies limit the use of these tracts to trees and wild pasture plants. Many of these tracts can be reclaimed at modest cost. After the gullies are eliminated, they are suited to pasture and hay crops. Capability unit VIIe-1; woodland group 2r8.

Morganfield Series

The Morganfield series consists of loamy, well-drained soils. These soils are on first bottoms along stream channels and along the outer edge of the Mississippi River bottoms, beneath the steep hillsides. They formed in sediments that recently washed from the nearly steep loess hills. They have slopes of 0 to 2 percent.

In the representative profile, the soil is brown silt loam to a depth of about 38 inches. Below this it is brown and grayish-brown, very friable silt loam mottled with gray.

Representative profile of Morganfield silt loam:

Ap—0 to 9 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; neutral; abrupt, smooth boundary.

C1—9 to 38 inches, brown (10YR 5/3) silt loam; massive, but has thin horizontal strata or bedding planes; very friable; neutral; gradual, smooth boundary.

C2—38 to 44 inches, brown (10YR 5/3) silt loam; few, medium, faint, dark grayish-brown (10YR 4/2) mottles; massive, but has thin horizontal strata or bedding planes; very friable; neutral; gradual, smooth boundary.

C3—44 to 50 inches, grayish-brown (10YR 5/2) silt loam; common, medium, faint, dark-gray (10YR 4/1) mottles; massive; very friable; neutral.

The Ap horizon ranges from 7 to 10 inches in thickness. The C horizon is brown to a depth of 30 inches or more. It has no mottles within a depth of 20 inches. The soils are neutral throughout.

Morganfield soils are next to Adler and Worthen soils. They have a lighter colored surface layer than Worthen soils. They are better drained than Adler soils.

Morganfield silt loam (Mo).—This well-drained soil is on first bottoms along stream channels and on the outer edge of the Mississippi River bottoms below the steep hillsides. Slopes are 0 to 2 percent. This soil is friable silt loam to a depth of 4 feet or more. In some tracts it has a few grayish-brown or dark grayish-brown mottles between depths of 20 and 30 inches.

This soil is easy to work and to keep in good tilth. It has high available water capacity. Plants nearly always have a good supply of moisture. Roots, water, and air penetrate easily.

This fertile soil is high in content of phosphorus and potassium. Most crops respond well to additions of these elements. Nonlegumes, such as cotton and corn, respond well to nitrogen. This soil is neutral. No lime is needed.

This soil is used for cotton, corn, soybeans, and vegetable crops. All crops suited to the climate of Obion County grow well. Capability unit I-1; woodland group 1o4.

Reelfoot Series

The Reelfoot series consists of somewhat poorly drained, loamy soils on the Mississippi River bottoms. These soils have slopes of 0 to 2 percent. They formed in sediments deposited by the river.

In the representative profile, the surface layer is very dark grayish-brown silt loam about 12 inches thick. The subsoil, to a depth of about 36 inches, is yellowish-brown, friable silty clay loam and silt loam mottled with gray and brown. Below this is grayish-brown, friable silt loam. It extends to a depth of 60 inches or more.

Representative profile of Reelfoot silt loam:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; slightly acid; abrupt, smooth boundary.

A12—7 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, granular structure; friable; common fine pores; slightly acid; clear, smooth boundary.

B2t—12 to 27 inches, yellowish-brown (10YR 5/4) silty clay loam; many, medium, faint, dark grayish-brown (10YR 4/2) mottles; moderate, medium, subangular blocky structure; friable; common clay films on vertical and horizontal ped faces; strongly acid; clear, smooth boundary.

B3—27 to 36 inches, yellowish-brown (10YR 5/4) silt loam; many, medium, distinct, gray (10YR 5/1) mottles; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

C—36 to 60 inches, grayish-brown (10YR 5/2) silt loam; many, medium, faint, brown (10YR 4/3) mottles; massive; friable; strongly acid.

The A horizon ranges from 10 to 20 inches in thickness. The Ap horizon ranges from 7 to 10 inches in thickness. The B2t horizon is silty clay loam or silt loam. The C horizon is grayish

brown or gray mottled with brown. The A horizon is slightly acid. The B and C horizons are medium acid or strongly acid.

Reelfoot soils are adjacent to Tiptonville and Forestdale soils. They are not so well drained as Tiptonville soils. They are better drained than Forestdale soils and have a less clayey subsoil.

Reelfoot silt loam (Re).—This somewhat poorly drained soil is on slight ridges on the Mississippi River bottoms. Slopes are 0 to 2 percent. During long periods of heavy rainfall, the water table is at a depth of 18 to 24 inches. The soil generally is not flooded, but it has a few inches of standing water, which is runoff from surrounding areas. The water drains away in a few hours, but in winter the soil remains wet for several weeks at a time.

After the excess water drains away, this soil has good tilth and is easy to work. Roots, water, and air penetrate easily. The available water capacity is high. Plants nearly always have a good supply of moisture.

Generally no lime is needed. The upper 10 to 20 inches is high in content of phosphorus and potassium. Most crops respond well to additions of these elements. All nonlegumes respond well to nitrogen.

Practically all the acreage is used for cotton, corn, and soybeans. Winter crops, such as small grain, and long-lived perennials, such as alfalfa, grow well only on the better drained tracts. Excess water kills or damages crops when rainfall is heavy. Capability units IIw-1; woodland group 204.

Routon Series

The Routon series consists of poorly drained soils that developed in loess. These soils are on uplands. Slopes are 0 to 2 percent.

In the representative profile, the surface layer is silt loam. It is dark grayish brown in the upper 8 inches, and the rest is light gray. The subsoil, about 36 inches thick, is mottled light-gray and grayish-brown, friable silt loam and silty clay loam. Below this is mottled gray, brown, and yellow, friable silt loam.

Representative profile of Routon silt loam :

- Ap—0 to 8 inches, dark grayish-brown (10YR 4/2) silt loam; few, fine, gray mottles; weak, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.
- A2g—8 to 18 inches, light-gray (10YR 6/1) silt loam; common, medium, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/6) mottles; weak, medium and fine, granular structure; friable; common dark stains and concretions; many fine pores; strongly acid; clear, wavy boundary.
- B21tg—18 to 26 inches, light-gray (10YR 6/1) silt loam; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; common clay films; common, fine, dark concretions; strongly acid; clear, smooth boundary.
- B22tg—26 to 44 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, medium, distinct, strong-brown (7.5YR 5/6) and gray (10YR 5/1) mottles; moderate, medium, subangular blocky structure; friable; common clay films; slightly acid; clear, smooth boundary.
- B3—44 to 54 inches, mottled gray (10YR 6/1), pale-brown (10YR 6/3), and yellowish-brown (10YR 5/8) silt loam; weak, medium, subangular blocky structure; friable; neutral; clear, smooth boundary.
- C—54 to 72 inches, mottled light-gray (10YR 6/1), yellowish-brown (10YR 5/6), and pale-brown (10YR 6/3) silt loam; massive; friable; neutral.

The Ap horizon ranges from 6 to 10 inches in thickness. The A horizon has a total thickness of 14 to 20 inches. It is gray or light gray in wooded tracts that have never been plowed. The B21tg and B22tg horizons are silt loam or silty clay loam. These two layers have a combined thickness of 2 to 3 feet. The A horizon is strongly acid through slightly acid, the B horizon is strongly acid through neutral, and the C horizon is neutral or mildly alkaline.

Routon soils are adjacent to the Bonn, Fountain, Center, and Calloway soils. They are lower in sodium content than Bonn soils. They have a more acid A horizon than Fountain soils. They are more poorly drained than Center and Calloway soils. They do not have a fragipan, which is characteristic of Calloway soils.

Routon silt loam (Rt).—This poorly drained soil is on uplands and has slopes of 0 to 2 percent. It has the profile described as representative for the series. Included in mapping are a few areas where this soil has a 10- to 20-inch layer of light-gray silt loam between the plow layer and the subsoil.

This soil generally is not flooded through stream overflow. In some tracts, however, it collects a few inches of water that stand for a few hours to a day or two. Then, the soil remains wet and soggy through winter and into spring.

If drained, this soil is easy to work, is easy to keep in good tilth, and is easily penetrated by roots, water, and air. During wet seasons, however, the root zone is restricted to the upper 12 to 18 inches. Plants ordinarily have a good supply of moisture because the available water capacity is high.

In some tracts the surface layer is neutral, but in most places this soil is slightly acid through strongly acid in the upper 14 or 20 inches. Below a depth of 14 to 20 inches, it is strongly acid through mildly alkaline. The response to lime varies. The content of phosphorus and potassium is low or medium; all crops respond well or fairly well to additions of these elements. Most nonlegumes respond well to nitrogen. Cotton plants remain green and the bolls do not open properly if too much nitrogen is added.

This soil is suited to soybeans. If adequately drained, it is suited to cotton, corn, and small grain. Most of the acreage is in soybeans. Some tracts are pastured, and a few are wooded. Capability unit IIIw-3; woodland group 1w6.

Routon-Bonn silt loams (Ru).—These poorly drained soils are mostly on low upland benches next to the Obion River bottoms. Slopes are 0 to 2 percent. About 80 percent of each mapped area is the Routon soil. The Bonn soil is conspicuous because it occurs as white spots, commonly about half an acre or less in size, and supports little or no vegetation.

Routon silt loam has a 6- to 10-inch dark grayish-brown plow layer. The next layer is gray or light-gray, very friable silt loam 8 to 14 inches thick. The subsoil, between depths of 18 and 54 inches, is light-gray or grayish-brown, friable silty clay loam or silt loam.

Bonn silt loam has a grayish-brown plow layer 6 to 10 inches thick. The next layer is light-gray, friable silt loam 6 to 16 inches thick. The subsoil, to a depth of 50 inches or more, is grayish-brown, brownish-gray, or gray, friable silty clay loam or silt loam.

The Routon soil generally is slightly acid through strongly acid in the upper 14 to 20 inches. Below this depth, it is strongly acid to mildly alkaline. The response to lime varies. The Bonn soil has a high sodium content to a depth of 50 inches. It is slightly acid or neutral in the

upper 18 inches. Below this depth it is mildly alkaline or moderately alkaline. Both soils are medium in phosphorus and potassium content. Crop response to additions of these elements is fair to good. Most nonlegumes respond well to nitrogen. Heavy applications, however, keep cotton plants green and prevent the bolls from opening in fall.

Some tracts are flooded nearly every winter or spring. The water table is at or near the surface in winter and early in spring, and the soils are wet and soggy. When the soils dry out, they are easy to work and to keep in good tilth. Roots, water, and air readily penetrate the Roton soil, and plants generally have a good moisture supply. The Bonn soil is droughty in summer and fall and is more poorly drained than the Roton soil. Its subsoil is poorly aerated and restricts the movement of water and roots.

Most of the acreage is used for soybeans. A few areas are used for cotton, corn, and pasture. Cotton and corn are not so well suited as soybeans. A few, small tracts are wooded.

Acreages of these soils become less productive as the white spots become more numerous. Land grading or smoothing is risky. Such practices are likely to increase the size of the white spots and adversely affect the drainage of an entire field on which the soil material high in sodium has been spread. Eliminating the spots generally is not practical. First, drainage ditches have to be installed to remove the excess water. Then, each spot must be limed with a material high enough in calcium to replace the sodium. Capability unit IIIw-3; woodland group 1w6.

Sharkey Series

The Sharkey series consists of poorly drained soils in low places on the Mississippi River bottoms at the western edge of the county. Slopes are 0 to 2 percent. The soils developed in thick beds of clay deposited by the Mississippi River.

In the representative profile, the surface layer is very dark grayish-brown, plastic clay about 8 inches thick. Below this, to a depth of 60 inches or more, is mottled dark-gray and gray, very plastic clay.

Representative profile of Sharkey clay:

- Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) clay; weak, medium and coarse, granular structure; firm, plastic and sticky; neutral; abrupt, smooth boundary.
- B2tg—8 to 19 inches, dark-gray (10YR 4/1) clay; common, fine, distinct, dark yellowish-brown mottles; moderate, medium, subangular blocky structure; firm, very plastic and sticky; neutral; gradual, smooth boundary.
- B22g—19 to 40 inches, gray (10YR 5/1) clay; common, medium, distinct, brown (10YR 4/3) and dark yellowish-brown (10YR 4/4) mottles; moderate, medium, subangular blocky structure; very firm, very plastic and sticky; neutral; gradual, wavy boundary.
- Cg—40 to 60 inches, dark-gray (5Y 4/1) clay; common, medium, distinct, dark yellowish-brown (10YR 4/4) mottles; weak, medium, angular blocky structure; very firm, very plastic; neutral.

The 6- to 10-inch Ap horizon is very dark grayish brown in cultivated areas but is very dark gray in wooded tracts. In places calcium carbonate concretions and specks of calcium carbonate occur below a depth of 3½ or 4 feet. In a few places the Cg horizon is silty clay loam, silt loam, or loam. These soils are neutral or mildly alkaline throughout.

Sharkey soils are next to Bowdre and Iberia soils. They have more clay in the upper 10 to 20 inches than Iberia soils. They have more clay below the A horizon than Bowdre soils.

Sharkey clay (Sc).—This poorly drained soil occupies scattered segments of old channels along the Mississippi River, along the western edge of the county. It formed in beds of clay, more than 40 inches thick, deposited by ponded water from the Mississippi River. Slopes are 0 to 2 percent.

In a few places loamy sediments are below a depth of 40 inches. Most areas are covered by floodwater or by standing water that has run off the surrounding higher places. Water stands for several days to 2 weeks during wet periods in winter and spring. The water table is at or near the surface when rainfall is heavy. It remains within a depth of about 3 feet, which is near the water level of Reelfoot Lake.

This soil is difficult to work. It is sticky and plastic when wet, but is hard when dry. It is fairly easy to work when moist. It swells when wet and shrinks as it dries. Cracks 2 to 3 inches wide form at the surface as the soil dries and extend to a depth of about 2 feet. More than half the acreage is low and remains wet or moist. The low areas seldom become dry enough for cracks to form. The available water capacity is high. Plants ordinarily have a good supply of moisture. The high clay content retards the movements of roots, water, and air.

This fertile soil is neutral or mildly alkaline throughout. No lime is needed. The content of phosphorus and potassium is high. The response to additions of these elements is slight or none. Nonlegumes respond well to nitrogen.

The highest, best drained tracts that have been cleared are used for soybeans, cotton, and corn. The low wooded tracts are suited to water-tolerant trees, such as bald-cypress, sweetgum, and cottonwood, but are poorly suited to row crops or pasture. Logging operations are restricted to summer and fall because of the excess water in winter and spring and the clayey texture of the soil. Food and cover for waterfowl can be grown. In summer, deer can bed down or graze in canebrakes where tree growth is sparse. Capability unit IIIw-2; woodland group 3w6.

Smoothed Land, Memphis Soil Material

Smoothed land, Memphis soil material (Sm) consists mostly of former gullied land that has been filled with material, dominantly Memphis soils, from surrounding areas. Most areas are on hillsides where slopes are 12 to 30 percent. They have been seeded, mostly to tall fescue or bermudagrass for pasture. A small number have been graded and compacted for urban uses, such as building sites for factories, shopping centers, and airports. These graded and compacted sites are small and occupy fairly gentle slopes. The soil material is brown silt loam and is friable, except where it has been compacted for building sites.

Smoothed land is suited to grasses for pasture or lawns. It erodes easily if overgrazed. Trees and shrubs grow well. Capability unit VIe-1; woodland group 2r8.

Swamp

Swamp (Sw) consists of low wooded areas that are under 1 foot to 3 feet of water from late in fall through winter and spring and into the summer. During the wettest years, water remains nearly all year in some areas, espe-

cially those near Reelfoot Lake. In many, the water table remains at or near the surface the entire summer. In others, it drops as much as 3 feet below the surface. The soil material is various shades of gray. Along the Obion River, the texture is silt loam or silty clay loam. In areas bordering Reelfoot Lake, it ranges from silty clay loam to clay. The soil generally is neutral. In most areas slopes are less than 1 percent.

Swamp is conspicuous because the only vegetation is water-tolerant trees, such as baldcypress and water tupelo. Logging is difficult, and tree growth is slow.

Swamp is a choice spot for duck hunting because it provides water and cover during the hunting season. It produces little, if any, food for waterfowl. Because water is near the surface, Swamp is cool in summer and is an excellent spot for deer to bed down. Capability unit VIIw-1; woodland group 4w6.

Tiptonville Series

The Tiptonville series consists of moderately well drained, loamy soils on slight ridges on the Mississippi River bottoms at the western edge of the county. Slopes are 0 to 2 percent. The soils developed in a mixture of sediments from the river and the nearby hills.

In the representative profile, the surface layer is very dark grayish-brown silt loam about 12 inches thick. The subsoil, to a depth of about 24 inches, is brown, friable silty clay loam. Below this, to a depth of about 55 inches or more, is yellowish-brown and brown, very friable silt loam mottled with gray and grayish brown.

Representative profile of Tiptonville silt loam:

- Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; slightly acid; abrupt, smooth boundary.
- A12—8 to 12 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, granular structure; compacted in top 2 inches, very friable below; slightly acid; clear, smooth boundary.
- B21t—12 to 20 inches, brown (10YR 5/3) silty clay loam; moderate, medium, subangular blocky structure; friable; common clay films on vertical and horizontal ped faces; common dark stains on vertical ped faces; medium acid; clear, smooth boundary.
- B22t—20 to 24 inches, brown (10YR 5/3) silty clay loam; few, fine, faint, pale-brown mottles; moderate, medium, subangular blocky structure; friable; few clay films mostly on vertical ped faces; medium acid; clear, smooth boundary.
- B3—24 to 40 inches, yellowish-brown (10YR 5/4) silt loam; common, medium, faint, grayish-brown (10YR 5/4) and gray (10YR 5/1) mottles; weak, medium, subangular blocky structure; very friable; strongly acid; clear, smooth boundary.
- C—40 to 55 inches, brown (10YR 5/3) silt loam; few, medium, faint, gray (10YR 5/1) and dark grayish-brown (10YR 4/2) mottles; weak, medium, subangular blocky structure; very friable; strongly acid.

The A horizon is very dark grayish brown or very dark brown and ranges from 10 to 20 inches in thickness. The B horizon is brown or yellowish-brown silty clay loam or silt loam. The A horizon and the upper 6 inches of the B horizon have no mottles. Pale-brown, gray, or grayish-brown mottles occur below a depth of 16 to 26 inches. The C horizon is brown, grayish brown, or gray and has a few mottles. The A horizon is slightly acid. The B and C horizons are strongly acid or medium acid.

Tiptonville soils are on the Mississippi River bottom adjacent to Reelfoot and Worthen soils. They are better drained than Reelfoot soils. They are not so well drained as Worthen soils.

Tiptonville silt loam (Tc).—This soil is on slight ridges on the Mississippi River bottom at the western edge of the county. Slopes are 0 to 2 percent.

This soil has no mottles in the surface layer or in the upper 6 inches of the subsoil, but it has mottles of pale brown, grayish brown, dark grayish brown, and gray below a depth of 16 to 26 inches.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. The available water capacity is high. Plants nearly always have a good supply of moisture.

The content of phosphorus and potassium is high in the surface layer. Most crops respond well to additions of these elements. All crops but legumes respond well to additions of nitrogen. The surface layer is slightly acid. No lime is needed.

Practically all the acreage is used for row crops, mainly cotton, corn, and soybeans. A few tracts are used for vegetables and small grain. All the crops commonly grown in the county are suited. Capability unit I-1; woodland group 2o4.

Waverly Series

The Waverly series consists of poorly drained, loamy soils on first bottoms. These soils formed in sediments recently washed from the uplands and have slopes of 0 to 2 percent.

In the representative profile, the soil is friable silt loam to a depth of 5 feet or more. It is dark grayish brown and grayish brown in the upper 16 inches and light gray mottled with brown and yellow below.

Representative profile of Waverly silt loam:

- Ap—0 to 9 inches, dark grayish-brown (10YR 4/2) silt loam; a few, faint, light-gray (10YR 6/1) mottles; weak, medium, granular structure; friable; strongly acid; abrupt, smooth boundary.
- Cg1—9 to 16 inches, grayish-brown (2.5Y 5/2) silt loam; common, fine, faint light-gray and distinct dark-brown mottles; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.
- Cg2—16 to 30 inches, light-gray (10YR 6/1) silt loam; common, fine, distinct yellowish-brown and faint dark grayish-brown mottles; weak, medium, subangular blocky structure; friable; common, very dark grayish-brown stains; strongly acid; clear, smooth boundary.
- Cg3—30 to 60 inches, light-gray (10YR 6/1) silt loam; common, fine, distinct, yellowish-brown mottles; massive; friable; many, fine, dark-brown stains and concretions; strongly acid.

The Ap horizon is gray, grayish brown, or dark grayish brown. It commonly has some mottles and is 6 to 10 inches thick. The O horizon is light gray or grayish brown mottled with gray and brown.

Waverly soils are adjacent to Birds, Falaya, and Rounton soils. They are more poorly drained than Falaya soils. They are less clayey and more acid below the surface layer than Rounton soils. They are more acid in the upper 40 inches than Birds soils.

Waverly silt loam (Ws).—This poorly drained soil is on first bottoms along the smaller streams, mostly in the eastern half of the county. It has the profile described as representative for the series. In most places the plow layer is dark grayish-brown silt loam 6 to 10 inches thick. In wooded areas the surface layer is gray. Slopes are 0 to 2 percent.

The water table rises to within a depth of about 8 inches and remains during much of the wet period in winter and

spring. It drops to a depth of 4 feet or more in summer and fall. Most tracts are flooded each winter and spring. Occasionally some are flooded in summer.

After the excess water drains away, this soil is easy to work and to keep in good tilth. Roots, water, and air easily penetrate to a depth of 4 feet or more. Plants nearly always have a good supply of moisture. The available water capacity is high.

Content of phosphorus and potassium is low. Crops respond well to additions of these elements. Cotton responds especially well to fairly heavy additions of potassium. Nonlegumes, such as corn and tall fescue, respond well to nitrogen, but heavy applications on cotton keep the plants green late in fall and prevent bolls from opening properly. Unless limed, this soil is generally strongly acid throughout. A few areas are slightly acid or neutral, especially below a depth of about 3 feet. Crops generally respond well to lime.

Soybeans, corn, and pasture are suited. Capability unit IIIw-3; woodland group 2w6.

Waverly silt loam, frequently flooded (Wt).—This poorly drained soil occupies some of the lowest areas on the Obion River bottoms. It consists of sediments that were washed from the uplands of northwest Tennessee and part of western Kentucky. Slopes are 0 to 2 percent. The soil is gray, friable silt loam to a depth of 6 feet or more. Included in mapping are a few strips of better drained soils along old sloughs and ditches and spots of soils that are loam or fine sandy loam.

This Waverly soil is flooded during most of the winter and spring. Floodwater stands in some places during any heavy rainfall. The water table is at or near the surface throughout most of the winter and spring. It probably remains within a depth of 4 feet during most of the summer and fall.



Figure 9.—Frequently flooded area of Waverly silt loam on low part of Obion River bottom.

Excess water makes this soil practically impossible to work. It also retards the growth of roots and prevents the movement of air. The available water capacity is high, and runoff is very slow. Plants always have an adequate or excessive supply of moisture.

The content of phosphorus and potassium is low. This soil is strongly acid.

Nearly all the acreage is poorly suited to row crops, hay, and pasture. Some of the highest strips along the outer edge can be drained and used for row crops. Practically all the acreage is wooded. In places, trees have been killed either by flooding or by the high water table (fig. 9). This soil is an excellent site for growing food and cover for wildlife. Capability unit VIIw-1; woodland group 2w6.

Worthen Series

The Worthen series consists of well-drained, loamy soils on the outer edge of the Mississippi River bottoms. Slopes are 0 to 2 percent.

In the representative profile, the surface layer, about 16 inches thick, is very dark grayish-brown silt loam. The subsoil, to a depth of about 30 inches, is brown, very friable silt loam. The underlying material, several feet thick, is brown and grayish-brown, very friable silt loam.

Representative profile of Worthen silt loam:

Ap—0 to 8 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; neutral; abrupt, smooth boundary.

A12—8 to 16 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, medium, granular structure; very friable; neutral; abrupt, smooth boundary.

B—16 to 30 inches, brown (10YR 4/3) silt loam; weak, fine and medium, granular structure; very friable; slightly acid; clear, smooth boundary.

C1—30 to 56 inches, brown (10YR 5/3) silt loam; a few, fine, distinct, light brownish-gray mottles; massive; very friable; common, medium, black stains; slightly acid; clear, smooth boundary.

C2—56 to 72 inches, grayish-brown (10YR 5/2) silt loam; a few, fine, distinct, dark yellowish-brown mottles; massive; very friable; common, medium, soft, black concretions and many, coarse, black stains; neutral.

The A horizon is very dark grayish brown or very dark brown. It ranges from 10 to 20 inches in thickness. The B horizon is brown or dark brown. In some places, however, it has a few pale-brown mottles. The C horizon is brown, grayish brown, or gray mottled with brown and gray. Reaction throughout the profile is slightly acid or neutral.

Worthen soils are associated with Adler and Morganfield soils. They are much darker in the upper 10 to 20 inches than Adler and Morganfield soils.

Worthen silt loam (Wu).—This well-drained soil is on the Mississippi River bottoms, at the western edge of Obion County. Slopes are 0 to 2 percent.

This soil is easy to work and to keep in good tilth. Roots, water, and air penetrate easily. Plants nearly always have a good supply of moisture. The available water capacity is high.

This soil is high in content of phosphorus and potassium. Most crops respond well to additions of these elements. Nonlegumes respond well to nitrogen. The soil is neutral throughout. No lime is needed.

All crops commonly grown in the county are suited. Capability unit I-1; woodland group 1o4.

Use of the Soils for Crops and Pasture

The soils of Obion County are used extensively for cultivated crops and pasture. This section explains how the soils can be managed for these purposes. It explains the capability grouping used by the Soil Conservation Service, describes the soils in each capability unit, and suggests management suited to the soils in each unit. This section also shows estimates of yields of the principal crops grown in the county under two levels of management.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, all kinds of soil are grouped at three levels: the capability class, the subclass, and the unit. These levels are described in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife. (None in the county.)

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial crop produc-

tion and restrict their use to recreation, wildlife, water supply, or to use for esthetic purposes. (None in the county.)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture or range, woodland, wildlife habitat, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units

In the following pages the capability units in Obion County are described and suggestions for use and management of the soils are given. The capability unit designation for each soil in the county is given in the "Guide to Mapping Units." No specific statements are made concerning the use of fertilizer, desirable varieties and mixtures of seeds, or favorable dates for planting. Up-to-date information is published from time to time by the Tennessee Agricultural Experiment Station and the Extension Service. Personnel of the local office of the Soil Conservation Service and the Extension Service can furnish information helpful in interpreting this information.

CAPABILITY UNIT I-1

In this unit are loamy soils on bottom lands, mostly on the Mississippi River. These soils are well drained and moderately well drained. They are dominantly silt loam to a depth of 4 feet or more. The available water capacity is high. Slopes exceed 2 percent in only a few places.

Soil tests are needed before lime and fertilizer are added. These soils are easy to work. They have a wide range in reaction and natural fertility. Plant roots penetrate to a depth of 4 feet or more. Some tracts are flooded occasionally in winter and early in spring. In most places the floodwater stands for only a few hours, but in a few places it stands for several days.

The soils are nearly level and are suited to row crops each year. They are suited to all the commonly grown crops and pasture plants. Plant roots and stalks replenish the supply of organic matter and keep the soil in good tilth.

Runoff from the nearby hills and floodwater are the only limitations. In places drainage ditches are needed to remove excess water. Land grading or smoothing eliminates low spots that hold water.

CAPABILITY UNIT IIe-1

The soils in this unit are loamy and well drained and moderately well drained. Their plow layer is friable silt loam, and their subsoil is friable silt loam or silty clay loam. Plant roots penetrate to a depth of 30 inches or more. In some places a weak fragipan below a depth of about 30 inches somewhat restricts root growth and movement of air and water. Slopes are 2 to 5 percent.

All crops grown in Obion County are suited.

Controlling erosion is the main concern. Cultivated areas are subject to washing. These soils should not be cultivated every year. A row crop can be grown every other year in the cropping system, or for 2 years if followed by 2 years of a close-growing crop. Any commonly grown row crop and close-growing hay and pasture crops can be used. Stripcropping or farming on the contour in a system of terraces reduces runoff, conserves water, and keeps the soil fertile. Sloping areas are well suited to contour farming, terracing, and stripcropping.

A suitable cropping system, adequate fertilization, liming, and water control are important in management. These practices produce a good vegetative cover and a large amount of crop residue, which supplies organic matter and keeps the soil in good tilth.

CAPABILITY UNIT IIe-2

Grenada silt loam, 2 to 5 percent slopes, the only soil in this unit, is moderately well drained and has a fragipan. The upper 24 inches is silt loam that is easily penetrated by roots, water, and air. Water moves so slowly through the fragipan that the 6 to 8 inches just above the pan becomes waterlogged during wet periods. In most places roots are restricted to the upper 24 inches.

Unless limed, this soil is medium acid or strongly acid. It is easy to work. Because the root zone is fairly shallow, this soil is slightly droughty in summer. Crops respond well to additions of fertilizer and lime.

Most crops commonly grown in the county are suited. Cotton, soybeans, and small grain grow well. Tall fescue, white clover, lespedeza, and orchardgrass are the chief hay and pasture crops. Alfalfa stands ordinarily do not last more than 2 years because of the limited root zone and seasonal wetness in the subsoil.

Erosion caused by runoff and restricted internal drainage are the main limitations. Suitable cropping systems, adequate fertilization, and water control practices are needed.

This soil is not suitable for cultivation every year. A winter cover crop should be planted every other year. A suitable cropping system is 2 years of row crops; for example, cotton or soybeans and 2 years of grass and legumes. Farming on the contour along with terracing or stripcropping reduce runoff and erosion. Fertilizer applied according to results of soil tests provides a better plant

cover, which helps to reduce runoff and evaporation. Turning under stalks and stubble from high-yielding crops replenishes the supply of organic matter and helps to keep the soil in good tilth.

CAPABILITY UNIT IIw-1

Level, somewhat poorly drained and poorly drained soils on first and second bottoms and on uplands are in this unit. These soils have a surface layer of silt loam. The underlying material is generally silt loam or silty clay loam. In a few spots on the Mississippi River bottom, thin, clayey layers occur below a depth of 3 feet.

Most areas are flooded or ponded during wet periods in winter and spring. Generally the water drains away in a few hours and leaves the soil wet and soggy for several weeks at a time. Other tracts are flooded for a few hours to a week or more. Most areas are wet and soggy throughout winter and into spring. A few near Reelfoot Lake remain wet into summer, and the water table drops to a depth of 3 or 4 feet. In other areas it drops to a depth of 5 feet or more.

These soils are easy to work and have high available water capacity. They have a fairly wide range in natural fertility. The amounts of lime and fertilizer needed should be determined by soil tests.

All the row crops commonly grown in the county are suited. Occasionally during wet periods in spring, crops have to be replanted. Soybeans, for example, can be planted late. A small grain can be grown if surface drainage is good and flooding is not severe. These soils are too wet for alfalfa. Grasses and some legumes grow well, but pastures are generally too wet and too soft for grazing in winter and early in spring.

Excess water is the main limitation. Drainage ditches and land grading and smoothing to eliminate low spots improve drainage (fig. 10). Selecting crops that grow in summer and crops that are least likely to be damaged by excess water in winter helps to insure successful cropping.

These soils can be row cropped every year. They are nearly level and are not subject to erosion. Incorporating large amounts of residue helps to supply organic matter and preserve tilth. Adequate fertilization and liming, where needed, provide large amounts of residue in the form of stalks and roots.

CAPABILITY UNIT IIIe-1

Well drained and moderately well drained soils are in this unit. Their plow layer is friable silt loam that is easy to work. The subsoil is friable silt loam or silty clay loam. Slopes are 2 to 8 percent. In places a weak fragipan slightly restricts root growth and the movement of water and air below a depth of about 18 inches.

These soils have high available water capacity and moderate natural fertility. In unlimed areas, they are medium acid or strongly acid in the upper 2 to 3 feet.

These soils are suited to all crops grown in the county. If used for pasture, they can be grazed in winter and spring because they are not likely to become wet and soft.

Controlling erosion is the main concern. The soils tend to erode readily in cultivated areas. Runoff and erosion can be controlled by using a suitable cropping system, adequate fertilization, and water control practices, such as grass waterways and contour farming in combination with

terraces or strips. Terraces are especially beneficial because slopes are fairly long.

If the soils are farmed on the contour, a suitable cropping system is 1 year of a row crop, 1 year of a small grain, and then 2 or 3 years of grass and legumes for hay and pasture. If the soils are strip-cropped, a suitable system is 1 year of row crops and 2 years of grass and legumes.

Adequate fertilization increases yields and provides larger amounts of residue. Residue protects the soil against erosion, replenishes the supply of organic matter, and preserves tilth.

CAPABILITY UNIT IIIe-2

The soils in this unit have a fragipan at a depth of 20 to 24 inches. Slopes are 2 to 8 percent. Above the fragipan, the soil is friable silt loam that is easily worked and penetrated by roots, water, and air.

Unless limed, these soils are medium acid or strongly acid. They are low in content of phosphorus and low or medium in potassium. Because of the fairly shallow root zone, they are droughty in summer.

The restricted root zone above the pan limits the crops that can be grown. Tall fescue, white clover, annual lespedeza, and sericea lespedeza are suitable pasture plants. Cotton and soybeans are fairly well suited, but corn and alfalfa are poorly suited. Alfalfa stands ordinarily become weedy and die after 1 or 2 years.

The fragipan restricts the movement of water. Consequently, runoff is great, and erosion is more difficult to control. A suitable cropping system, adequate fertilization, sod waterways, contour farming along with terraces, and strip-cropping all help to control erosion.

A suitable cropping system consists of 1 year of row crops, planted on the contour, followed by 2 years of grass and legumes for hay or pasture. Also, 2 years of clean-tilled crops planted on the contour followed by 6 years of grass and legumes is suitable. Adequate fertilization produces stalks and roots, which protect the soil, supply organic matter, and preserve tilth.

CAPABILITY UNIT IIIw-1

The one soil in this unit, Calloway silt loam, has a fragipan at a depth of about 2 feet. This soil is on broad flats on uplands and is somewhat poorly drained. Slopes are less than 3 percent.

The plow layer and the upper part of the subsoil are friable silt loam. Below a depth of about 2 feet is a dense, compact, poorly aerated fragipan. Roots, water, and air easily penetrate as far down as the pan.

Rainfall and runoff from higher places collect on these soils and drain away slowly. In winter and spring, the soil is wet and even ponded in spots, but in summer it is somewhat droughty because the root zone is limited. Excess wetness interferes with spring planting in some years.

This soil is low or medium in content of phosphorus and potassium. It is easy to work after the excess water drains away. Unless limed, it is strongly acid or medium acid. Most crops respond well to additions of lime and fertilizer.

Crops that grow in summer and crops that tolerate wetness are suited to this soil. Soybeans, grain sorghum, cotton, and corn are among the crops that grow well in summer. Small grain grows fairly well in areas free of



Figure 10.—Land smoothing on soils in capability unit IIw-1.

standing water. Deep-rooted legumes, such as alfalfa, are poorly suited.

Wetness in winter and spring is the main limitation. Selecting crops that tolerate wetness and using open ditches to remove water from pockets and low areas are needed.

Because it is level, this soil is not readily eroded if a row crop is grown every year. The stalks and stubble should be plowed under to supply organic matter and preserve tilth. Adequate amounts of fertilizer and lime are needed.

CAPABILITY UNIT IIIw-2

The soils in this unit are on bottom lands of the Mississippi River. Drainage is poor. Most areas are flooded or ponded in winter and spring. The water drains away in only a few hours in some areas, but it remains for several days on others.

The surface layer is commonly clay or silty clay loam, but in a few areas it is silt loam. The subsoil is high in clay

content. It is plastic to a depth of at least 3 feet.

The clayey plow layer is sticky and plastic when wet and hard and cloddy when dry. It can be worked within only a narrow range of moisture content. These clayey soils swell when wet and shrink as they dry. Consequently, a network of cracks about 1 to 2 inches wide and several inches deep form in the soil when dry. The silt loam plow layer is easy to work after the excess water drains away.

The available water capacity is high, and the moisture supply is generally sufficient for plant growth. Natural fertility and reaction vary. The amounts of fertilizer and lime needed should be determined by soil tests.

Annual summer crops and crops that tolerate wetness in winter and spring are well suited to these soils. Among these crops are soybeans, grain sorghum, white clover, tall fescue, and annual lespedeza. In the better drained areas, cotton is suited.

Flooding, standing water, and the sticky, clayey surface layer are limitations. Open ditches remove most excess

water during most of the growing season. In many areas land smoothing and grading eliminate low spots and further improve drainage. Little can be done to prevent flooding in winter and spring, especially in areas next to Reelfoot Lake. Tile drainage is unsatisfactory because the clayey texture makes tillage and preparation of a seedbed difficult. Plowing or turning the soil late in fall or early in spring when it is moist or even slightly wet is preferable. Freezing weather and rain break up the large clods, and at planting time the soil can be harrowed into a fairly smooth seedbed.

Erosion is no limitation. Row crops, such as soybeans, can be grown every year. Plowing under stalks and stubble supplies organic matter and improves tilth.

CAPABILITY UNIT IIIw-3

Poorly drained soils are in this unit. These soils have a surface layer of silt loam that is underlain by several feet of silt loam or silty clay loam. They are poorly aerated and are saturated with water for long periods in winter and spring. The excess wetness and poor aeration prevent proper growth of roots.

Most tracts have standing water that has run off higher areas. Some, especially those down near the Obion River, are covered with floodwater from streams. Flooding occurs once nearly every winter on a few tracts in the lowest areas. The excess water sometimes delays planting in spring, but seldom affects yields.

Soybeans, sorghum, and other short-lived summer annuals that can be planted late are well suited. Tall fescue and white clover grow well, but the soils are often too wet and too soft for grazing in winter and spring. Cotton and corn are fairly well suited. Occasionally they have to be planted late because the soils warm up slowly in spring. Alfalfa and similar deep-rooted, long-lived perennials are poorly suited.

Wetness in winter and spring is the main limitation. This limitation can be partly overcome by selecting crops that grow in summer or that tolerate wetness in winter. Open ditches remove some of the excess surface water. Land grading and smoothing eliminate low spots and improve drainage in most areas, but this is a risky practice on slickspots, which have a high sodium content. Little can be done to lower the seasonal high water table or to control flooding.

A row crop can be grown every year if surface drainage is provided. Plowing under the stalks and stubble of limed and fertilized crops helps to replenish the supply of organic matter and to keep the soils in good tilth.

CAPABILITY UNIT IIIw-4

Only Bowdre silty clay, a somewhat poorly drained soil, is in this unit. It has a surface layer of silty clay or clay 10 to 20 inches thick. Below this is silt loam, loam, or silty clay loam. Slopes are 0 to 2 percent. Even though this soil is not flooded by streams, it is ponded in winter and spring.

Excess water and the clayey plow layer are the main limitations. The soil is sticky when wet and hard when dry. It swells when wet and shrinks as it dries. A network of cracks 1 to 3 inches wide form in the upper 10 to 20 inches when this soil is dry.

This soil is slightly acid or neutral. No lime is needed. Natural fertility is high, but crops generally respond to

fertilizer. The available water capacity is high. Plants generally have an adequate supply of moisture.

Annual summer row crops and crops that tolerate wetness in winter and spring are suited. A row crop can be grown every year because erosion is not a hazard. Other suitable crops are soybeans, cotton, corn, and grain sorghum. A small grain can be grown on the better drained soils if excess water is removed.

Drainage ditches help to remove the excess water. Land grading or smoothing eliminates low spots that hold water. Plowing under residue, such as stalks and stubble, supplies organic matter and improves tilth.

CAPABILITY UNIT IVe-1

Well drained and moderately well drained soils on uplands are in this unit. Slopes range from 8 to 12 percent. Erosion has removed much of the original surface layer. The plow layer is friable silt loam that is easy to work. The subsoil is silt loam or silty clay loam. In places a weak fragipan begins at a depth of 16 to 32 inches. It somewhat restricts root growth and the movement of water and air.

These soils are moderate in natural fertility. Unless limed, they are medium acid or strongly acid above the pan. The available water capacity is high. Crops respond well to lime and fertilizer.

Row crops can be grown occasionally, but are poorly suited because of the erosion hazard. Cotton, corn, soybeans, alfalfa, orchardgrass, red clover, white clover, tall fescue, and lespedeza are among the crops that grow well. These soils also produce good pasture. They support grazing throughout the year because they do not become wet and soft.

Controlling erosion is the main concern. Because of the slope and the high silt content, the soils erode readily. A suitable cropping system, adequate fertilization, and water control practices, such as contour cultivation and strip-cropping, are needed. Adequate fertilization promotes the growth of roots and stalks, which protect the soils against erosion and improve tilth.

CAPABILITY UNIT IVe-2

Grenada silt loam, 5 to 8 percent slopes, eroded, the one soil in this unit, has a fragipan at a depth of 14 to 20 inches. The upper 14 to 20 inches is friable silt loam that roots, water, and air penetrate easily. The fragipan is dense, compact silt loam or silty clay loam. It restricts root growth and drainage.

This soil is droughty in summer. Unless limed, it is medium acid or strongly acid. It is easy to work. Crops respond well to additions of lime and fertilizer.

Plants that have a shallow root system or roots that penetrate the fragipan are well suited. Sericea lespedeza, tall fescue, white clover, and annual lespedeza grow well. Cotton and soybeans are fairly well suited, but corn and alfalfa are poorly suited. After 1 or 2 years, alfalfa stands ordinarily become infested with weeds and die. Row crops grow only fairly well, even if adequately fertilized. Pasture can be grazed nearly all year. Excess water drains away in only a few hours.

Erosion has left a fairly shallow zone for roots and water storage. Consequently, runoff is increased and erosion is difficult to control. A suitable cropping system, adequate fertilization, and water control practices, including sod waterways, terracing, strip-cropping, and contour

farming, are all important in erosion control. Adequate applications of fertilizer increase the growth of roots and stalks, which supply organic matter and keep the soil in good tilth.

CAPABILITY UNIT VIe-1

This unit consists of well drained and moderately well drained, loamy soils on uplands. Slopes range from 12 to 30 percent. In some tracts, all the original surface layer has been removed by erosion and shallow gullies have formed. Tracts that are still wooded are only slightly eroded. Generally the plow layer is brown or dark-brown, friable silt loam, and the subsoil is dark-brown, friable silt loam. In places there is a weak fragipan at a depth of about 16 inches. The pan somewhat restricts root growth and the movement of water and air.

These soils are moderate in natural fertility. Unless limed, they are strongly acid to medium acid in the upper 2 or 3 feet. Available water capacity is high, but the supply of water is limited by rapid runoff. Pasture and hay crops respond well to lime and fertilizer. Except where small gullies have formed and in areas of smoothed land that have been compacted, these soils are easy to work.

Row crops are poorly suited because runoff is rapid and the soils erode readily. Pasture and hay crops, such as tall fescue, white clover, orchardgrass, bermudagrass, and alfalfa, grow well. Grazing is possible all winter because excess water drains away rapidly.

These steep soils are readily eroded in unprotected areas. The main concerns in management are controlling runoff and erosion and increasing the water supply. Well-fertilized grasses and legumes make good hay and pasture, and unless overgrazed or mowed too closely, help in reducing runoff and erosion. A grass-legume mixture provides more protection than a legume grown alone.

CAPABILITY UNIT VIe-2

Grenada silt loam, 8 to 12 percent slopes, eroded, the only soil in this unit, has a dense fragipan at a depth of 14 to 20 inches. Most of the original surface layer has been removed by erosion. The material above the fragipan is brown or yellowish-brown, friable silt loam. It is easy to work and can be penetrated easily by roots, water, and air. The pan restricts root growth and slows drainage and is poorly aerated.

This soil is droughty during dry periods. Unless limed, it is medium acid to strongly acid. It is low in natural fertility.

Grasses and legumes that have a shallow root system or roots that can penetrate the fragipan are best suited. They respond well to lime and fertilizer. Among the grasses and legumes that grow well are tall fescue, white clover, bermudagrass, sericea lespedeza, and annual lespedeza. Deep-rooted perennials, such as alfalfa, are poorly suited. They generally become infested with weeds and die after 1 or 2 years. Pastures can be grazed most of the winter because excess water drains away quickly. Row crops are poorly suited because the soil erodes readily.

Strong slopes and the fragipan make this soil difficult to manage. Grasses and legumes, if adequately fertilized, make good hay and pasture. They also reduce runoff and the hazard of erosion.

CAPABILITY UNIT VIIe-1

Only Memphis soils-Gullied land complex, 12 to 30 percent slopes, is in this unit. The surface layer is silt loam. In open tracts it is brown or dark brown. In wooded tracts it has the dark stain of organic matter. The subsoil is dark-brown or brown silt loam or silty clay loam. About a third of some hillsides and as much as half of others are badly scarred where gullies have formed.

Unless limed, these soils are medium acid or strongly acid to a depth of 2 or 3 feet. Natural fertility is moderate. Available water capacity is high, but runoff is rapid and therefore limits the amount of moisture that can be retained for plants.

Trees can be grown on these soils. Steep slopes and the rough, uneven surface make the operation of farm machinery practically impossible.

CAPABILITY UNIT VIIe-2

Only Gullied land is in this unit. It consists of soils that have been severely eroded and gullied. Gullies have formed a network of narrow drainageways that cover about three-fourths of some areas. In other areas there are large, deep, caving gullies that have nearly vertical sides. Most of these gullies have cut into steep hillsides. Slopes range from 12 to 50 percent. The soil material between the gullies is brown or dark-brown, friable silt loam. It has moderate natural fertility and is slightly acid to strongly acid.

Gullied land is suited to trees, but growth is slow. Water has to be diverted from these tracts before trees can grow. Black locust regenerates naturally in the western part of the county.

Stabilizing the gullies is a major concern. The deep, caving gullies cannot be stabilized by vegetation alone. Reclamation generally is not practical because of the expense of moving a large volume of soil material. Some of the smaller gullies can be filled with surrounding soil material. Reclaimed areas are good for pasture, and the milder slopes can be row cropped occasionally.

CAPABILITY UNIT VIIw-1

Wet soils on first bottoms along Reelfoot Lake and the Obion River are in this unit. Many of these areas hold water nearly all year. On these, the only vegetation is baldcypress. Other areas are flooded most of the winter and spring, but dry out in summer. In some areas along the lake, the soils are clayey. All the rest are silt loams.

These soils are suited to trees that tolerate wetness. The wetter areas are attractive to waterfowl. The better drained areas are suitable for growing food for waterfowl.

Flooding and standing water are the main limitations. Little can be done on individual farms to prevent flooding or to remove standing water. Even though extensive drainage systems are being installed in the Obion River bottoms, it is doubtful whether the soils can be used for row crops. Most areas are wooded or are covered with shrubs like button willow. A sound harvesting program is needed for good woodland management. Levees are needed in areas to be developed for hunting waterfowl to assure an abundant supply of water.

Estimated Yields

Estimated yields of the main crops grown in Obion County, under two levels of management, are shown in table 3. The figures in table 3 represent averages for the 10-year period that ended in 1966. The estimates are based on data obtained through experiments, through field trials, and on information obtained from farmers.

No yields are shown for Falaya silt loam, frequently flooded; Gullied land; Swamp; and Waverly silt loam, frequently flooded. Generally none of these soils are suitable for row crops or pasture.

The "A" columns in table 3 show the yields that can be expected under average management. The "B" columns show the yields that can be expected under improved management. Improved management includes—

1. Selection of crops and cropping systems suited to the soil.
2. Application of fertilizer and lime in accordance with needs indicated by chemical tests and by past cropping and fertilizing practices.
3. Adequate seedbed preparation.
4. Use of crop varieties that produce high yields and are suited to the area.
5. Use of suitable methods of planting or seeding, use of proper rate of seeding, and planting of seed at right time.
6. Inoculation of legumes.
7. Shallow cultivation of row crops.
8. Control of weeds, insects, and diseases.
9. Adequate surface drainage.
10. Suitable harvesting methods.

Following are the specified improved management practices, by crops, under which the yields shown in table 3 were obtained.

Corn.—For soils that produce 80 bushels or more per acre, plant for a stand of about 16,000 plants per acre and apply about 120 pounds of nitrogen per acre.

For soils that produce 60 to 80 bushels per acre, plant for a stand of about 12,000 plants per acre and apply 90 pounds of nitrogen per acre.

For soils that produce 40 to 60 bushels per acre, plant for a stand of about 8,000 plants per acre and apply about 60 pounds of nitrogen per acre.

Soils that produce less than 40 bushels per acre under improved management are poorly suited to corn.

For estimated yields of corn silage, assume that the plants that yield 5 bushels of corn will yield about 1 ton of silage. For example, a soil that produces 100 bushels per acre would produce approximately 20 tons of silage per acre. The number of plants and the rates of fertilization per acre are the same for silage as for corn grown for grain.

Cotton.—For soils that produce more than 1 bale per acre, space rows about 38 to 40 inches apart, thin the number of plants to between 20,000 and 60,000 per acre without skips, and apply about 70 pounds of nitrogen per acre.

Soils that produce less than about 1 bale per acre are poorly suited to cotton.

Alfalfa.—Apply up to 15 pounds of nitrogen and 20 of borax at seeding time. Apply annually, after the first year, 20 pounds of borax plus the amounts of phosphate and potash that soil tests indicate are needed. Control grazing and cut hay at the proper time and to the right stubble height; do not cut hay from about September 10 to the date of the first killing frost.

Wheat.—Apply 20 to 30 pounds of nitrogen at seeding time in fall and 30 pounds per acre as a topdressing in spring.

Management of the Soils as Wildlife Habitat^a

The wildlife population of any area depends on the availability of food, cover, and water in a suitable combination. Wildlife habitat can be created, improved, or maintained by establishing desirable vegetation and by developing water supplies in suitable places.

The suitability of each soil in Obion County for elements of wildlife habitat and kinds of wildlife is shown in table 4. The numerical ratings shown refer only to the suitability of the soil. They do not take into account the climate, the present use of the soil, or the distribution of wildlife and human populations. The suitability of individual sites has to be determined by onsite inspection.

The ratings shown in table 4 are defined as follows. *Well suited*, indicated by numeral 1, means that habitat generally is easily created, improved, or maintained, that the soil has few or no limitations that affect management, and that satisfactory results can be expected. *Suited*, indicated by numeral 2, means that habitat can be created, improved, or maintained in most places, that the soil has moderate limitations that affect management, and that moderate intensity management and fairly frequent attention may be required for satisfactory results. *Poorly suited*, indicated by numeral 3, means that habitat can be created, improved, or maintained in most places, that the soil has severe limitations, and that habitat management is difficult and expensive and produces results not always satisfactory. *Unsuited*, indicated by numeral 4, means that it is highly impractical or impossible to create, improve, or maintain habitat and that unsatisfactory results are probable.

Elements of wildlife habitat shown in table 4 are defined as follows:

GRAIN AND SEED CROPS: Grain-producing or seed-producing annuals, such as corn, sorghum, millet, and soybeans.

GRASSES AND LEGUMES: Domestic grasses and legumes that are established by planting and that furnish food and cover for wildlife. Examples of grasses are tall fescue, orchardgrass, ryegrass, and panicgrass. Examples of legumes are clover, annual lespedeza, and bush lespedeza.

WILD HERBACEOUS UPLAND PLANTS: Native or introduced perennial grasses, forbs, and weeds that provide

^a Prepared by FLOYD R. FESSLER, biologist, Soil Conservation Service.

TABLE 3.—*Estimated average yields per acre of principal crops under two levels of management*

Estimates are based on average rainfall. Figures in columns A indicate yields to be expected under common, or average, management; figures in columns B indicate yields under high-level, or improved, management. Absence of figure indicates the crop is not suited to or is not commonly grown on the soil specified]

Soil	Corn		Cotton lint		Soybeans		Wheat		Hay						Pasture ¹	
									Alfalfa		Lespedeza		Red clover			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	Bu.	Lb.	Lb.	Bu.	Bu.	Bu.	Bu.	Tons	Tons	Tons	Tons	Tons	Tons	Cow- acre- days ²	Cow- acre- days ²
Adler silt loam.....	65	100	675	800	28	42	30	45	2.5	4.0	1.4	2.0	1.8	2.5	150	200
Birds silt loam.....	45	65	375	575	24	36					.9	1.5			95	140
Bowdre silty clay.....	35	55	400	600	24	30					1.0	1.4			90	150
Calloway silt loam.....	40	60	420	550	20	32	21	32			.8	1.2			105	150
Center silt loam.....	40	62	425	575	25	35	21	32	1.8	3.5	.8	1.4	1.4	2.0	105	150
Collins silt loam.....	60	100	600	800	28	42	25	40	2.2	3.0	1.4	2.0	1.8	2.5	150	200
Commerce silt loam.....	55	90	450	750	26	36	21	32	2.2	3.0	1.2	1.8	1.8	2.5	140	195
Convent silt loam.....	55	90	500	700	28	40					1.2	1.9	1.4	2.0	125	180
Dekoven silt loam.....	50	80	450	675	28	38	21	32			1.0	1.5	1.4	2.0	120	180
Falaya silt loam.....	55	80	500	700	25	35					1.2	1.9	1.4	2.0	135	185
Forestdale silt loam.....	35	55	375	500	20	30					.8	1.2			100	145
Forestdale silty clay loam.....	25	50	350	425	18	26					.6	1.0			90	135
Fountain silt loam.....	35	55	450	575	24	32	21	32			.8	1.4			115	165
Grenada silt loam, 2 to 5 percent slopes.....	50	75	475	650	26	34	23	35	1.6	2.2	.9	1.7	1.4	2.0	120	170
Grenada silt loam, 2 to 5 percent slopes, eroded.....	40	60	300	475	20	28	15	30	1.3	1.9	.7	1.0	1.0	1.6	105	150
Grenada silt loam, 5 to 8 percent slopes.....	45	65	425	525	20	26	18	36	1.5	2.0	.7	1.3	1.4	2.0	120	160
Grenada silt loam, 5 to 8 percent slopes, eroded.....	30	45	250	450	14	20	15	30	1.1	1.5	.4	1.0	.8	1.4	105	140
Grenada silt loam, 8 to 12 percent slopes, eroded.....							13	20			.3	.7			95	130
Iberia silty clay loam.....	35	55	375	500	27	35					.8	1.2			90	140
Loring silt loam, 2 to 5 percent slopes.....	55	80	525	725	25	36	35	45	2.5	3.5	1.2	1.7	1.8	2.5	130	180
Loring silt loam, 2 to 5 percent slopes, eroded.....	50	80	450	650	22	30	25	35	2.2	2.9	.9	1.5	1.4	2.2	125	175
Loring silt loam, 5 to 8 percent slopes, eroded.....	40	60	350	525	18	25	20	30	2.0	2.6	.6	1.4	1.0	1.6	115	160
Loring silt loam, 8 to 12 percent slopes.....	40	65	350	490	18	25	18	28	2.0	2.6	.8	1.2	1.0	1.6	120	165
Loring silt loam, 8 to 12 percent slopes, eroded.....	30	50	300	450	15	20	17	25	2.0	2.4	.4	.9	.7	1.3	105	145
Loring silt loam, 12 to 20 percent slopes, eroded.....															70	125
Memphis silt loam, 2 to 5 percent slopes.....	60	90	625	750	28	38	33	45	2.8	4.0	1.2	1.8	1.8	2.5	140	190
Memphis silt loam, 2 to 5 percent slopes, eroded.....	50	80	475	650	21	32	26	40	2.5	3.4	.7	1.3	1.4	2.2	130	185
Memphis silt loam, 5 to 8 percent slopes.....	55	85	500	675	23	34	31	42	2.6	3.8	1.1	1.5	1.6	2.4	130	187
Memphis silt loam, 5 to 8 percent slopes, eroded.....	40	60	400	575	19	25	26	38	2.3	2.9	.6	1.2	1.0	1.6	115	160
Memphis silt loam, 8 to 12 percent slopes, eroded.....	35	50	275	500	16	22	17	30	2.0	2.5	.5	1.0	.7	1.3	105	145
Memphis silt loam, 12 to 20 percent slopes, eroded.....															70	125
Memphis silt loam, 20 to 30 percent slopes, eroded.....															70	125
Memphis silt loam, 30 to 50 percent slopes.....																
Memphis soils-Gullied land complex, 12 to 30 percent slopes.....															50	80
Morganfield silt loam.....	65	100	675	775	35	40	35	50	2.5	4.0	1.4	1.9	1.8	2.5	150	210
Reelfoot silt loam.....	55	80	400	650	28	35	25	35	2.0	2.8	1.2	1.6	1.4	2.0	115	165
Routon silt loam.....	35	55	390	500	22	35					.8	1.2			110	160
Routon-Bonn silt loams.....	32	50	375	475	20	30					.6	1.0			105	155
Sharkey clay.....	30	50	375	450	25	30					.8	1.2			90	140

Footnotes at end of table.

TABLE 3.—Estimated average yields per acre of principal crops under two levels of management—Continued

Soil	Corn		Cotton lint		Soybeans		Wheat		Hay						Pasture ¹	
									Alfalfa		Lespedeza		Red clover			
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	Bu.	Lb.	Lb.	Bu.	Bu.	Bu.	Bu.	Tons	Tons	Tons	Tons	Tons	Tons	Cow- acre- days ²	Cow- acre- days ²
Smoothed land, Memphis soil material															70	125
Tiptonville silt loam	60	90	500	725	30	40	27	45	2.2	3.0	1.4	1.9	1.8	2.5	125	200
Waverly silt loam	40	60	400	500	23	34					.8	1.4			95	135
Worthen silt loam	60	100	550	750	30	40	35	50	2.7	4.0	1.4	1.9	1.8	2.5	125	200

¹ Improved pasture of tall fescue (Ky. 31) and white clover, of orchardgrass and white clover, or of bermudagrass.

² Number of days in 1 year that 1 acre will provide grazing for 1 cow, 1 steer, 1 horse, 5 swine, or 7 sheep without injury to the pasture.

TABLE 4.—Suitability for elements of wildlife habitat and kinds of wildlife

[1 means well suited, 2 means suited, 3 means poorly suited, and 4 means unsuited]

Soil and map symbols	Wildlife habitat elements							Classes of wildlife		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous upland plants	Hard- wood woody plants	Conifer- ous woody plants	Wet- land food and cover plants	Shal- low water develop- ments	Open- land wild- life	Wood- land wild- life	Wet- land wild- life
Adler: Ad	2	1	2	1	3	3	3	1	2	3
Birds: Bd	3	2	2	1	3	3	2	2	2	2
Bowdre: Bo	2	2	2	1	3	3	2	2	1	2
Calloway: Ca	2	2	1	1	3	3	2	1	2	2
Center: Ce	2	2	1	1	3	3	2	1	2	2
Collins: C	2	1	2	1	3	3	3	1	2	3
Commerce: Cm	2	2	1	1	3	3	2	1	2	2
Convent: Cn	2	2	2	1	3	3	2	2	2	2
Dekoven: Dk	3	2	2	1	3	3	1	2	2	2
Falaya: Fa	2	2	2	1	3	3	2	2	2	2
Falaya, frequently flooded: Fb	3	3	3	1	3	2	3	3	2	2
Forestdale: Fd, Fe	3	2	2	1	3	3	1	2	2	2
Fountain: Fn	2	2	2	1	3	3	1	2	2	2
Grenada: GrB, GrB2, GrC, GrC2, GrD2	2	1	1	1	3	4	4	1	1	4
Gullied land: Gu	4	3	2	1	3	4	4	3	2	4
Iberia: Ie	3	2	2	1	3	3	1	2	2	2
Loring:										
LoB, LoB2	1	1	1	1	3	4	4	1	1	4
LoC2	2	1	1	1	3	4	4	1	1	4
LoD, LoD2	2	1	1	1	3	4	4	1	1	4
LoE2	3	2	1	1	3	4	4	2	2	4
Memphis:										
MfB, MfB2	1	1	1	1	3	4	4	1	1	4
MfC, MfC2	2	1	1	1	3	4	4	1	1	4
MfD2	2	1	1	1	3	4	4	1	1	4
MfE2, MfF2, MfG, MgF	3	2	1	1	3	4	4	2	2	4
Morganfield: Mo	1	1	1	1	3	4	4	1	1	4
Reelfoot: Re	2	2	1	1	3	3	2	1	2	2
Routon: Rt, Ru	2	2	2	1	3	3	1	2	2	2
Sharkey: Sa	3	2	2	1	3	3	1	2	2	2
Smoothed land, Memphis soil material:										
Sm	3	2	1	1	3	4	4	2	2	4
Swamp: Sw	4	4	4	4	4	1	1	4	4	1
Tiptonville: Ta	1	1	1	1	3	3	3	1	1	3
Waverly: Ws	3	2	2	1	3	2	2	2	2	2
Waverly, frequently flooded: Wt	4	3	3	1	3	1	3	3	2	2
Worthen: Wu	1	1	1	1	3	4	4	1	1	4

food and cover for upland wildlife. Examples are beggarweed, perennial lespedeza, wild bean, pokeberry, partridgepea, crotons, and cheat.

HARDWOOD WOODY PLANTS: Nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, or foliage (browse) used extensively as food by wildlife and that are established mainly through natural processes. They include oak, beech, cherry, dogwood, maple, grape, honeysuckle, greenbrier, and autumn olive.

CONIFEROUS WOODY PLANTS: Cone-bearing trees and shrubs that are used mainly as cover but also furnish food in the form of browse, seeds, or fruitlike cones. They are established through natural processes but can be seeded. Examples are pines, cedars, and ornamentals.

WETLAND FOOD AND COVER PLANTS: Annual and perennial, wild herbaceous plants that grow on moist to wet sites, but not submerged or floating aquatics. These plants furnish food or cover for wetland wildlife. Examples are smartweed, wild millet, spikerush and other rushes, sedges, burreed, tearthumb, and anilema.

SHALLOW WATER DEVELOPMENTS: Low dikes and water control structures established to create habitat principally for waterfowl. They can be designed so that they can be drained, planted, and flooded, or can be used as permanent impoundments to grow submerged aquatics.

OPENLAND WILDLIFE: Quail, doves, cottontail rabbit, fox, meadowlark, field sparrow, and other birds and mammals that normally live on cropland, pasture, meadow, lawn, and in other open areas where grasses, herbs, and shrubs grow.

WOODLAND WILDLIFE: Woodcock, thrush, vireo, squirrel, deer, raccoon, wild turkey, and other birds and mammals that normally live in wooded areas.

WETLAND WILDLIFE: Ducks, geese, rail, heron, shore birds, mink, muskrat, and other mammals and birds that normally live in wet areas, marshes, and swamps.

Use of the Soils for Woodland⁴

When the first settlers arrived, dense forests covered the entire county. Oaks, hickory, maple, and yellow-poplar grew on uplands, and baldcypress, gum, cottonwood, and oaks on the river bottoms. Trees 5 to 8 feet in diameter and 150 feet tall were common. Much of the original timber was cleared for crops.

In 1961, about 28.3 percent of the county, or 81,900 acres, was wooded (?). About 33,000 acres was on bottom land along the Mississippi and Obion Rivers, 80,000 acres in the steep loess bluffs, and the rest in small, scattered tracts throughout the uplands and on creek bottoms. The Tennessee Department of Conservation owns about 15,000 acres in the Reelfoot Lake area and another 7,000 acres in the Gooch Wildlife Management Area. Most of the hardwood timber along the Obion River has been killed by "swamping." Only baldcypress, water tupelo, willow, and buttonbush are left. About 44 percent of the sawtimber in the county is baldcypress. In 1960, about 8.7 million board feet of timber was cut, mainly for local use.

⁴By C. M. HENNINGER, woodland conservationist, Soil Conservation Service.

Obion County is in two major land resource areas: the Southern Mississippi Valley Alluvium and the Southern Mississippi Valley Silty Uplands.

The soils of Obion County have been assigned to 11 woodland groups. Groupings are based on the suitability of the soils for trees. A woodland suitability group consists of soils that have similar potential productivity, produce similar tree crops, and require similar management.

Table 5 shows, by woodland groups, the potential productivity of specified trees and the factors to be considered in management. The woodland group designation for each soil in the county is shown in the "Guide to Mapping Units" at the back of this survey. No designation is given for Gullied land.

Some of the terms used in table 5 are defined as follows.

Productivity.—The amount of a given wood crop that a given soil can produce under a specified level of management is expressed as the site index. Site index is the average height, in feet, that the dominant and codominant trees of a given species, growing on a specified soil, will reach in 50 years. For cottonwood, the site index is the average height trees will attain in 30 years. The average annual growth in board feet (International Rule) is based on the average site index.

Equipment limitations.—Some soil characteristics and topographic features restrict or prohibit the use of conventional equipment for planting and harvesting wood crops, for constructing roads, for controlling unwanted vegetation, and for controlling fires. The limitation is *slight* if there is little or no restriction on the type of equipment that can be used or the time of the year that equipment can be used. The limitation is *moderate* if the use of equipment is restricted by one or more unfavorable characteristics, such as slope, stones or other obstructions, seasonal wetness, instability, or risk of injury to roots of trees. The limitation is *severe* if special equipment is needed or the use of such equipment is severely restricted by one or more unfavorable soil characteristics.

Seedling mortality.—Ratings in this column refer to the expected loss of seedlings as a result of unfavorable soil characteristics or topographic features, not as a result of plant competition. Even if healthy seedlings of suitable species are correctly planted or occur naturally in adequate numbers, some will not survive if conditions are unfavorable. The ratings are based on the mortality of seedlings among the number normally planted for adequate stocking. *Slight* mortality is the loss of less than 25 percent of the seedlings; *moderate*, between 25 and 50 percent; and *severe*, more than 50 percent.

Erosion hazard.—Ratings in this column refer to the degree of potential soil erosion when timber is cut and removed from the stand. The rating is *slight* if little or no erosion control is needed. A rating of *moderate* indicates that some attention must be given to prevent unnecessary soil erosion. A rating of *severe* indicates that intensive treatment, specialized equipment, and methods of operation are needed to minimize the loss of soil through erosion.

Preferred species.—This indicates the kinds of trees to be favored in management of existing stands and the kinds that are suitable for planting. The species designated in table 5 are not listed in order of priority.

The first element in the symbol indicates the relative productive potential of the soil for growing wood crops.

It expresses the site quality, based on the site index of one or more important forest types or species. The *numeral 1* indicates very high productive potential, *numeral 2* high, *numeral 3* moderately high, and *numeral 4* moderate.

The second element in the woodland group symbol indicates the soil or physiographic characteristic that is the primary cause of hazards or limitations in woodland use or management. The *letter w* indicates excessive wetness. The *letter r* indicates limitations based on relief or steep slope. The *letter o* indicates no significant soil-related limitations.

The third element in the symbol indicates the degree of hazard or limitation and the general suitability of the soils for certain kinds of trees. The *numeral 1* indicates soils that have no significant limitations and are best suited to needleleaf trees (pine or redcedar). The *numeral 2* indicates soils that have one or more moderate limitations and are best suited to needleleaf trees. The *numeral 3* indicates soils that have one or more severe limitations and are best suited to needleleaf trees. The *numeral 4* indicates soils that have no significant limitations and are best suited to broadleaf trees. The *numeral 5* indicates soils that have one or more moderate limitations and are best suited to broadleaf trees. The *numeral 6* indicates soils that have one or more severe limitations and are best suited to broadleaf trees. The *numeral 7* indicates soils that have no significant limitations and are suitable for either needleleaf or broadleaf trees. The *numeral 8* indicates soils that have one or more moderate limitations but are suitable for either needleleaf or broadleaf trees. The *numeral 9* indicates soils that have one or more severe limitations but are suitable for either needleleaf or broadleaf trees.

There is no native pine in Obion County. A few small plantations have been established on some of the more severely eroded upland soils. For purposes of classification, baldcypress was included in the broadleaf group.

Engineering Uses of the Soils^{*}

This section is useful to those who need information about soils used as structural material or as foundation upon which structures are built. Among those who can benefit from this section are planning commissions, town and city managers, land developers, engineers, contractors, and farmers.

Among properties of soils highly important in engineering are permeability, strength, compaction characteristics, soil drainage condition, shrink-swell potential, grain size, plasticity, and soil reaction. Also important are depth to the water table, depth to bedrock, and soil slope. These properties, in various degrees and combinations, affect construction and maintenance of roads, airports, pipelines, foundations for small buildings, erosion control structures, drainage systems, irrigation systems, ponds and small dams, and systems for disposal of sewage and refuse.

Information in this section of the soil survey can be helpful to those who—

1. Select potential residential, industrial, commercial, and recreational sites.

2. Plan farm drainage systems, irrigation systems, farm ponds, and other structures for controlling water and conserving soil.
3. Evaluate alternate routes for roads, highways, pipelines, and underground cables.
4. Seek sources of gravel, sand, or clay.
5. Correlate performance of structures already built with properties of the kinds of soil on which they are built, for the purpose of predicting performance of structures on the same kind or similar kinds of soil in other locations.
6. Predict the trafficability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement other publications, such as maps, reports, and aerial photographs, that are used in preparation of engineering reports for a specific area.

Most of the information in this section is presented in tables 6 and 7, which show, respectively, several estimated soil properties significant in engineering and interpretations for various engineering uses.

This information, along with the soil map and other parts of this publication, can be used to make interpretations in addition to those given in tables 6 and 7, and it also can be used to make other useful maps.

This information, however, does not eliminate need for further investigations at sites selected for engineering works, especially works that involve heavy loads or that require excavations to depths greater than those shown in the tables, generally depths greater than 6 feet. Also, inspection of sites, especially small sites, is needed because many delineated areas of a given soil mapping unit contain small areas of other kinds of soil that have strongly contrasting properties and different suitabilities or limitations for soil engineering.

Some of the terms used in this soil survey have special meaning to soil scientists that is not known to all engineers. The Glossary defines many of these terms commonly used in soil science.

Engineering Soil Classification Systems

The two systems most commonly used in classifying samples of soils for engineering are the AASHO system (7) adopted by the American Association of State Highway Officials and the Unified system (8) used by the SCS engineers, the Department of Defense, and others.

The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. Within each group the relative engineering value of the soil material is indicated by a group index number. Group indexes range from 0 for the best material to 20 or more for the poorest. They can be determined only by laboratory tests. None are shown in this survey because laboratory data are not available for the soils in Obion County. The estimated AASHO classification for all soils mapped in the county is given in table 6.

^{*} Prepared by DAVID L. ROYSTER, chief soils engineer, Materials and Test Division, Tennessee Department of Highways, and WILDER C. HUDSON, agricultural engineer, Soil Conservation Service.

TABLE 5.—Woodland groups, wood crops,

Woodland group and soil symbols	Productivity		
	Wood crops	Site index	Average yearly growth
			<i>Bd. ft. (International rule)</i>
Group 1o4: Ad, Cl, Mo, Wu. Well drained and moderately well drained, level soils that are loamy to a depth of 5 feet or more; on bottom land. Only a few trees remain on these soils.	Cottonwood..... Sweetgum..... Bottom land oak.....	106+ 96+ 96+	720+ 600+ 600+
Group 1w5: Cm, Cn, Dk, Fa. Poorly drained and somewhat poorly drained, level soils that are loamy to a depth of 5 feet or more; mostly on bottom land. Only a few small patches of woods remain on these soils. One large tract is near Reelfoot Lake.	Cottonwood..... Sweetgum..... Bottom land oak..... Green ash.....	106+ 96+ 96+ 86-95	720+ 600+ 600+ 385-500
Group 1w6: Fb, Fd, Fe, Fn, Rt, Ru. Poorly drained and somewhat poorly drained, level soils that have a loamy surface layer and subsoil; on uplands and bottom land. A few small wooded tracts are on the lowest parts, mostly on bottom land along the Obion River.	Cottonwood..... Sweetgum..... Bottom land oak.....	106+ 96+ 96+	720+ 600+ 600+
Group 2o4: Re, Ta. Somewhat poorly drained and moderately well drained, level soils that have a loamy surface layer and subsoil; on high bottom land of the Mississippi River. Only a few small tracts are wooded.	Green ash..... Cottonwood..... Sweetgum..... Bottom land oak..... Sycamore..... Yellow-poplar.....	76-85 96-105 86-95 86-95 96-105 (2)	280-385 570-720 385-500 385-500 500-600 (2)
Group 2o7: MfB, MfB2, MfC, MfC2, MfD2, MfE2. Well-drained, gently sloping to moderately steep soils that have a loamy surface layer and subsoil; on uplands. Numerous wooded tracts are on steeper areas.	Yellow-poplar..... Upland oak..... Cherrybark oak..... Black walnut..... Sweetgum..... Loblolly pine.....	96-105 76-85 86-95 80-95 86-95 86-95	500-600 240-345 385-500 (2) 385-500 740-920
Group 2w5: Bo, Ca, Ce. Somewhat poorly drained, level soils that have a clayey and loamy surface layer and a loamy subsurface layer and subsoil; on uplands. Only a few small tracts remain in woods.	Cottonwood..... Bottom land oak..... Sweetgum..... Yellow-poplar..... Sycamore.....	96-105 86-95 86-95 96-105 (2)	570-720 385-500 385-500 500-600 (2)
Group 2w6: Bd, le, Ws, Wt. Poorly drained, level soils that have a loamy surface layer and a loamy and clayey subsurface layer and subsoil; on bottom land. Some large wooded tracts are on these soils.	Cottonwood..... Green ash..... Bottom land oak..... Sweetgum.....	96-105 76-85 86-95 86-95	570-720 280-385 385-500 385-500
Group 2r8: MfF2, MfG, MgF, Sm. Well-drained, moderately steep and steep upland soils that have a loamy surface layer and subsoil, and former gullied land that has been smoothed. A large acreage is wooded.	Yellow-poplar..... Upland oak..... Sweetgum..... Cherrybark oak..... Loblolly pine.....	96-105 86-95 86-95 86-95 86-95	500-600 345-450 385-500 385-500 740-920
Group 3o7: GrB, GrB2, GrC, GrC2, GrD2, LoB, LoB2, LoC2, LoD, LoD2, LoE2. Moderately well drained, gently sloping to moderately steep soils that have a loamy surface layer and subsoil and a fragipan; on uplands. Numerous wooded tracts are on the steeper slopes.	Yellow-poplar..... Upland oak..... Sweetgum..... Loblolly pine.....	86-95 66-75 76-85 76-85	385-500 155-240 280-385 570-740
Group 3w6: Sa. Poorly drained, level soil on bottom land; clayey to a depth of 40 inches or more. Some large wooded tracts remain on these soils.	Cottonwood..... Green ash..... Bottom land oak..... Sweetgum.....	86-95 66-75 76-85 76-85	440-570 160-280 280-385 280-385
Group 4w6: Sw. Land that is under a few inches to a few feet of water nearly all year. Texture ranges from silt loam to clay.	Baldcypress..... Water tupelo.....	(2) (2)	(2) (2)

¹ To be favored in management, but not suitable for planting.

and factors in management

Factors in management			Preferred species
Erosion hazard	Equipment restriction	Seedling mortality	
Slight.....	Slight.....	Slight.....	Cottonwood, sweetgum, cherrybark oak, Nuttall oak, water oak, black walnut, yellow-poplar, green ash.
Slight.....	Moderate.....	Slight.....	Cottonwood, sweetgum, cherrybark oak, water oak, green ash, pecan, ¹ sycamore.
Slight.....	Severe.....	Moderate.....	Cottonwood, sweetgum, green ash, cherrybark oak, Nuttall oak, water oak, sycamore.
Slight.....	Slight.....	Slight.....	Cottonwood, sweetgum, green ash, cherrybark oak, Nuttall oak, yellow-poplar, black walnut, sycamore.
Slight.....	Slight.....	Slight.....	Yellow-poplar, black walnut, cherrybark oak, southern red oak, white oak, sweetgum, loblolly pine, black locust, white ash, ¹ black cherry. ¹
Slight.....	Moderate.....	Slight to moderate.....	Cottonwood, green ash, cherrybark oak, water oak, sweetgum, sycamore, yellow-poplar.
Slight.....	Severe.....	Severe.....	Cottonwood, ¹ green ash, baldcypress, willow oak, water oak, sweetgum, sycamore, water tupelo. ¹
Slight to moderate.....	Moderate.....	Slight.....	Yellow-poplar, black walnut, cherrybark oak, white oak, white ash, black cherry, loblolly pine, black locust.
Slight.....	Slight.....	Slight.....	Yellow-poplar, cherrybark oak, southern red oak, white oak, sweetgum, black walnut, loblolly pine.
Slight.....	Severe.....	Severe.....	Cottonwood, green ash, Nuttall oak, water oak, willow oak, sweetgum, baldcypress. ¹
Slight.....	Severe.....	Severe.....	Baldcypress, ¹ water tupelo. ¹

¹ No reliable data available.

TABLE 6.—*Estimates of soil properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in referring to other series that appear in the first column of this table.]

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	<i>In.</i>	<i>In.</i>			
Adler: Ad.....	20-30	0-60	Silt loam.....	ML	A-4
Birds: Bd.....	0-10	0-60	Silt loam.....	ML	A-4
*Bonn..... Mapped only with Routon soils.	0-10	0-18 18-50	Silt loam..... Silt loam and silty clay loam.	ML ML or CL	A-4 A-4 or A-6
Bowdre: Bo.....	0-20	0-15 15-50	Silty clay or clay..... Silt loam, loam.....	MH or CH ML or CL	A-7 A-4 or A-6
Calloway: Ca.....	18-24	0-24 24-45 45-72	Silt loam..... Silt loam..... Silt loam.....	ML ML or CL ML or CL	A-4 A-6 A-4
Center: Ce.....	24-36	0-14 14-44 44-72	Silt loam..... Silt loam and silty clay loam. Silt loam.....	ML ML or CL ML or CL	A-4 A-6 A-4
Collins: Cl.....	20-30	0-60	Silt loam.....	ML	A-4
Commerce: Cm.....	10-20	0-60	Silt loam.....	ML or CL	A-4
Convent: Cn.....	0-12	0-50	Silt loam.....	ML	A-4
Dekoven: Dk.....	0-6	0-12 12-36 36-72	Silt loam..... Silty clay loam..... Silt loam.....	ML or CL CL ML or CL	A-4 A-6 A-4 or A-6
Falaya: Fa, Fb.....	0-12	0-60	Silt loam.....	ML or CL	A-4
Forestdale: Fd, Fe.....	0-8	0-11 11-20 20-72	Silt loam..... Silty clay loam..... Silty clay and clay.....	ML or CL CL CH or MH	A-4 A-6 A-7
Fountain: Fn.....	0-8	0-12 12-72	Silt loam..... Silt loam.....	ML ML or CL	A-4 A-4 or A-6
Grenada: GrB, GrB2, GrC, GrC2, GrD2.....	24-72	0-24 24-48 48-72	Silt loam..... Silt loam..... Silt loam.....	ML or CL ML or CL ML or CL	A-4 A-6 A-4
Gullied land: Gu. No valid estimates can be made.					
Iberia: Ie.....	0-8	0-12 12-60	Silty clay loam..... Clay.....	CL CH	A-6 A-7
Loring: LoB, LoB2, LoC2, LoD, LoD2, LoE2.....	>72	0-7 7-32 32-46 46-72	Silt loam..... Silt loam..... Silt loam..... Silt loam.....	ML ML or CL ML or CL ML or CL	A-4 A-4 or A-6 A-4 A-4
*Memphis: MfB, MfB2, MfC, MfC2, MfD2, MfE2, MfF2, MfG, MgF. For Gullied land part of MgF, see Gullied land.	>72	0-14 14-29 29-72	Silt loam..... Silty clay loam..... Silt loam.....	ML ML or CL ML	A-4 A-4 or A-6 A-4
Morganfield: Mo.....	30-48	0-50	Silt loam.....	ML	A-4
Reelfoot: Re.....	24-36	0-12 12-27 27-60	Silt loam..... Silty clay loam..... Silt loam.....	ML ML or CL ML	A-4 A-6 A-4

significant in engineering

such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for Symbol > means more than. Symbol < means less than]

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
			<i>in. hr.</i>	<i>in./in. of soil</i>	<i>pH</i>	
100	100	90-100	0.63-2.0	0.20-0.23	6.6-7.8	Low.
100	100	90-100	0.63-2.0	0.20-0.23	6.1-7.8	Low.
100	95-100	90-100	0.63-2.0	0.20-0.23	6.1-7.3	Low.
100	95-100	95-100	0.06-0.20	0.12-0.16	7.4-8.4	Low.
100	100	95-100	0.06-0.20	0.15-0.20	6.1-7.3	High.
100	90-100	75-100	0.63-2.0	0.15-0.23	6.1-7.3	Low.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	0.06-0.20	0.15-0.17	5.1-6.0	Low.
100	95-100	90-100	0.63-2.0	0.20-0.23	5.1-7.3	Low.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	0.20-0.63	0.20-0.23	6.1-7.3	Low.
100	95-100	90-100	0.63-2.0	0.20-0.23	6.1-7.8	Low.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-5.5	Low.
100	95-100	95-100	0.20-0.63	0.20-0.23	6.6-7.3	Low.
100	100	95-100	0.63-2.0	0.20-0.23	6.6-7.3	Low.
100	100	90-100	0.63-2.0	0.20-0.23	6.1-7.8	Low.
100	100	95-100	0.63-2.0	0.20-0.23	6.6-7.8	Moderate.
100	100	95-100	0.63-2.0	0.20-0.23	6.6-7.8	Low.
100	100	95-100	0.63-2.0	0.20-0.23	5.1-5.5	Low.
100	100	95-100	0.63-2.0	0.18-0.23	5.1-6.0	Low.
100	100	95-100	0.63-2.0	0.15-0.20	5.1-6.0	Moderate.
100	95-100	95-100	<0.06	0.15-0.20	5.1-6.0	Moderate.
100	100	95-100	0.63-2.0	0.20-0.23	6.1-7.3	Low.
100	95-100	95-100	0.20-0.63	0.20-0.23	6.6-7.8	Low.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	0.06-0.20	0.15-0.17	5.1-5.5	Low.
100	100	95-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	<0.06	0.15-0.20	6.6-7.3	Moderate.
100	95-100	95-100	<0.06	0.15-0.20	6.6-7.8	High.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	95-100	90-100	0.20-0.63	0.15-0.17	5.1-5.5	Low.
100	95-100	90-100	0.63-2.0	0.20-0.23	5.1-6.5	Low.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	90-100	0.63-2.0	0.20-0.23	5.1-7.3	Low.
100	100	90-100	0.63-2.0	0.20-0.23	6.6-7.3	Low.
100	100	90-100	0.63-2.0	0.20-0.23	6.1-6.5	Low.
100	95-100	95-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	95-100	90-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.

TABLE 6.—*Estimates of soil properties*

Soil series and map symbols	Depth to seasonal high water table	Depth from surface	Classification		
			USDA texture	Unified	AASHO
	<i>In.</i>	<i>In.</i>			
*Routon: Rt, Ru----- For Bonn part of Ru, see Bonn series.	0-8	0-18 18-54 54-72	Silt loam----- Silt loam and silty clay loam. Silt loam-----	ML ML or CL ML or CL	A-4 A-4 or A-6 A-4
Sharkey: Sa-----	0-8	0-60	Clay-----	CH	A-7
Smoothed land, Memphis soil material: Sm. No valid estimates can be made.					
Swamp: Sw. No valid estimates can be made.					
Tiptonville: Ta-----	36-48	0-12 12-24 24-72	Silt loam----- Silty clay loam----- Silt loam-----	ML ML or CL ML	A-4 A-4 or A-6 A-4
Waverly: Ws, Wt-----	0-8	0-60	Silt loam-----	ML or CL	A-4
Worthen: Wu-----	30-72	0-72	Silt loam-----	ML or CL	A-4

TABLE 7.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils for referring to other series that appear

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Highway location	Dikes or levees
Adler: Ad-----	Good-----	Fair: low shear strength; very highly erodible on steep slopes.	Flooding-----	Unstable on steep slopes.
Birds: Bd-----	Poor: wetness-----	Poor: low shear strength; highly erodible on steep slopes; wetness.	Poor drainage; high water table; flooding.	Unstable on steep slopes.
*Bonn----- Mapped only with Routon soils.	Poor: wetness; high sodium content.	Poor: low shear strength; highly erodible on steep slopes; wetness.	Poor drainage; high water table.	Unstable on steep slopes.
Bowdre: Bo-----	Poor: high clay content in upper 10 to 20 inches.	Poor: high clay content in upper 10 to 20 inches; good below a depth of 20 inches.	High shrink-swell potential in upper 10 to 20 inches.	Plastic in upper 10 to 20 inches.
Calloway: Ca-----	Fair: wetness; fragipan at a depth of about 2 feet.	Fair: low shear strength; highly erodible on slopes.	Fragipan at a depth of about 2 feet.	Unstable on steep slopes.

significant in engineering—Continued

Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
			<i>In./hr.</i>	<i>In./in. of soil</i>	<i>pH</i>	
100	100	90-100	0.63-2.0	0.20-0.23	5.1-6.5	Low.
100	95-100	95-100	0.06-0.20	0.20-0.23	5.6-7.3	Low.
100	95-100	90-100	0.63-2.0	0.20-0.23	6.6-7.8	Low.
100	100	100	<0.06	0.15-0.20	6.6-7.8	High.
100	100	90-100	0.63-2.0	0.20-0.23	6.1-6.5	Low.
100	95-100	95-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	95-100	85-100	0.63-2.0	0.20-0.23	5.1-6.0	Low.
100	100	95-100	0.63-2.0	0.20-0.23	5.1-5.5	Low.
100	95-100	85-100	0.63-2.0	0.20-0.23	6.1-7.3	Low.

interpretations

in such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instruction in the first column of this table]

Soil features affecting—Continued					Degree and kind of limitation for septic tank filter fields
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	
Reservoir area	Embankments				
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Severe: flooding.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Poor drainage-----	Poor drainage; high water table.	Severe: poor drainage; high water table; flooding.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Slow permeability---	Poor drainage; low permeability; high sodium content.	Slow permeability; poor drainage; high water table; level.	Severe: poor drainage; high water table; slow permeability.
Rapidly permeable strata below a depth of 6 feet in places.	Plastic in upper 10 to 20 inches; good material below.	Slow permeability in upper 10 to 20 inches.	Slow water intake----	Slow permeability; level.	Severe: flooding.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Fragipan at a depth of about 2 feet; slow permeability.	Fragipan at a depth of about 2 feet; slow permeability.	Fragipan at a depth of about 2 feet; slow permeability; level.	Severe: fragipan at a depth of about 2 feet; slow permeability.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Highway location	Dikes or levees
Center: Ce.....	Fair: wetness.....	Fair: low shear strength; highly erodible on steep slopes.	Soil features favorable.	Unstable on steep slopes.
Collins: Cl.....	Good.....	Fair: low shear strength; very highly erodible on steep slopes.	Flooding.....	Unstable on steep slopes.
Commerce: Cm.....	Fair: wetness.....	Fair: low shear strength.....	High water table; flooding.	Unstable on steep slopes.
Convent: Cn.....	Fair: wetness.....	Fair: low shear strength; very highly erodible on steep slopes.	High water table; flooding.	Unstable on steep slopes.
Dekoven: Dk.....	Fair: wetness.....	Poor: low shear strength; highly erodible on steep slopes; wetness.	Poor drainage; high water table; flooding.	Unstable on steep slopes.
Falaya: Fa, Fb.....	Fair: wetness.....	Fair: low shear strength; steep slopes very highly erodible.	High water table; flooding.	Unstable on steep slopes.
Forestdale: Fd, Fe.....	Poor: wetness; high clay content.	Poor: high clay content; wetness.	High water table; poor drainage; moderate shrink-swell potential.	High clay content...
Fountain: Fn.....	Fair: wetness.....	Poor: low shear strength; highly erodible on steep slopes; wetness.	High water table; poor drainage.	Unstable on steep slopes.
Grenada: GrB, GrB2, GrC.	Fair: fragipan at a depth of about 2 feet.	Fair: low shear strength; highly erodible on steep slopes.	Fragipan at a depth of about 24 inches.	Unstable on steep slopes.
GrC2, GrD2.....	Fair: fragipan at a depth of 14 to 20 inches.	Fair: low shear strength; highly erodible on steep slopes.	Fragipan at a depth of 14 to 20 inches.	Unstable on steep slopes.
Gullied land: Gu; No interpretations. Material variable.				
Iberia: Ie.....	Poor: high clay content; wetness.	Poor: high clay content; wetness.	High shrink-swell potential; poor drainage; high water table; flooding.	High shrink-swell potential.

interpretations—Continued

Soil features affecting—Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Degree and kind of limitation for septic tank filter fields
Reservoir area	Embankments				
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Moderate to severe: intermittent wetness in subsoil.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Severe: flooding.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Severe: flooding; high water table.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Severe: flooding; high water table.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Poor drainage-----	Soil features favorable; level.	Severe: poor drainage; high water table; flooding.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Severe: high water table; flooding.
Soil features favorable.	High clay content; moderate shrink-swell potential.	Very slow permeability in subsoil.	Very slow permeability in subsoil; poor drainage.	Poor drainage; level; very slow permeability.	Severe: very slow permeability; high water table.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Poor drainage-----	Poor drainage; level.	Severe: poor drainage; high water table.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Slowly permeable fragipan at a depth of about 24 inches.	Slowly permeable fragipan at a depth of about 24 inches.	Slowly permeable fragipan at a depth of about 24 inches.	Severe: slowly permeable fragipan at a depth of about 24 inches.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Slowly permeable fragipan at a depth of about 14 to 20 inches.	Slowly permeable fragipan at a depth of 14 to 20 inches.	Some slopes excessive; slowly permeable fragipan at a depth of 14 to 20 inches.	Severe: slowly permeable fragipan at a depth of 14 to 20 inches; some slopes excessive.
Soil features favorable.	High shrink-swell potential.	Very slow permeability.	Very slow permeability; slow water intake; poor drainage.	Poor drainage; high shrink-swell potential; very slow permeability.	Severe: very slow permeability; poor drainage; flooding.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Highway location	Dikes or levees
Loring: LoB, LoB2, LoC2, LoD-----	Fair to good: fragipan at a depth of 18 to 36 inches.	Fair: low shear strength; highly erodible on steep slopes.	Fragipan at a depth of 18 to 36 inches.	Unstable on steep slopes.
LoD2, LoE2-----	Fair: fragipan at a depth of 16 to 20 inches.	Fair: low shear strength; highly erodible on steep slopes.	Fragipan at a depth of 16 to 20 inches.	Unstable on steep slopes.
*Memphis: MfB, MfB2-----	Good-----	Fair: low shear strength; highly erodible on steep slopes.	Soil features favorable.	Unstable on steep slopes.
MfC, MfC2, MfD2-----	Good-----	Fair: low shear strength; highly erodible on steep slopes.	Soil features favor- able.	Unstable on steep slopes.
MfE2, MfF2, MfG, MgF--- For Gullied land part of MgF, see Gullied land.	Good-----	Fair: low shear strength; highly erodible on steep slopes.	Hilly to steep; deep cuts required.	Unstable on steep slopes.
Morganfield: Mo-----	Good-----	Fair: low shear strength; highly erodible on steep slopes.	Soil features favor- able.	Unstable on steep slopes.
Reelfoot: Re-----	Fair to good: wet- ness.	Fair: low shear strength-----	Soil features favor- able.	Unstable on steep slopes.
*Routon: Rt, Ru----- For Bonn part of Ru, see Bonn series.	Poor: wetness-----	Poor: low shear strength; highly erodible on steep slopes; wetness.	Poor drainage; high water table.	Unstable on steep slopes.
Sharkey: Sa-----	Poor: high clay content; wetness.	Poor: high shrink-swell poten- tial; wetness.	Poor drainage; high water table; high shrink-swell po- tential; flooding.	High shrink-swell potential.
Smoothed land, Memphis soil material: Sm. No interpretations. Material variable.				

interpretations—Continued

Soil features affecting—Continued					Degree and kind of limitation for septic tank filter fields
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	
Reservoir area	Embankments				
Soil features favorable.	Adequate compaction only at optimum moisture content.	Moderately slowly permeable fragipan at a depth of 18 to 36 inches.	Moderately slowly permeable fragipan at a depth of 18 to 36 inches.	Fragipan at a depth of 18 to 36 inches; moderately slow permeability.	Severe: fragipan at a depth of 18 to 36 inches; moderately slow permeability.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Moderately slowly permeable fragipan at a depth of 16 to 20 inches.	Moderately slowly permeable fragipan at a depth of 16 to 20 inches.	Some slopes excessive; fragipan at a depth of 16 to 20 inches; moderately slow permeability.	Severe: fragipan at a depth of 16 to 20 inches; excessive slopes; moderately slow permeability.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Good drainage-----	Soil features favorable.	Soil features favorable.	Slight.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Good drainage-----	Excessive slopes-----	Soil features favorable.	Slight.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Good drainage-----	Excessive slopes-----	Excessive slopes----	Severe: excessive slopes.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Good drainage-----	Soil features favorable.	Soil features favorable; level.	Slight.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Severe: high water table.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Slow permeability---	Poor drainage; slow permeability.	Poor drainage; high water table; level.	Severe: poor drainage; high water table; slow permeability.
Soil features favorable.	High shrink-swell potential.	Very slow permeability.	Poor drainage; very slow permeability; slow water intake.	Poor drainage; very slow permeability; level.	Severe: very slow permeability; poor drainage; flooding.

TABLE 7.—*Engineering*

Soil series and map symbols	Suitability as source of—		Soil features affecting—	
	Topsoil	Road fill	Highway location	Dikes or levees
Swamp: Sw. No interpretations. Material variable.				
Tiptonville: Ta-----	Good-----	Good to fair: low shear strength.	Soil features favorable.	Unstable on steep slopes.
Waverly: Ws, Wt-----	Poor: wetness-----	Poor: low shear strength; highly erodible on steep slopes; wetness.	Poor drainage; high water table; flooding.	Unstable on steep slopes.
Worthen: Wu-----	Good-----	Good to fair: low shear strength.	Soil features favorable.	Unstable on steep slopes.

In the Unified system, soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt.

Soil scientists use the USDA textural classification (5). In this, the texture of the soil is determined according to the proportion of soil particles smaller than 2 millimeters in diameter, that is, the proportion of sand, silt, and clay.

Soil Properties Significant in Engineering

Estimated properties of the soils are given in table 6. These estimates are made for typical soil profiles, by layers sufficiently different to have different significance in soil engineering. The estimates are based on field observations made in the course of mapping, on test data for similar soils, and on experience with the same kinds of soil in other counties. No estimates are given on depth to bedrock, because the soils in Obion County are so deep that bedrock does not affect their use. Following are explanations of some of the columns in table 6.

The depth to the seasonal high water table is distance from the surface of the soil to the highest level that ground water reaches in the soil in most years.

Soil texture is described in table 6 in the standard terms used by the Department of Agriculture. These terms take into account relative percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. "Sand," "silt," "clay," and some of the other terms used in USDA textural classification are defined in the Glossary of this soil survey.

Permeability is that quality that enables a soil to transmit water or air. It relates only to the movement of water

downward through uncompacted soil. It does not include lateral seepage. It is estimated on basis of those soil characteristics observed in the field, particularly structure and texture. Flowpans, surface crusts, and other properties resulting from the use of the soils are not considered.

Available water capacity is the capacity of soils to hold water for use by most plants. It is commonly defined as the difference between the amount of water in the soil at field capacity and the amount at the wilting point. It is commonly expressed as inches of water per inch of soil.

Reaction is the degree of acidity or alkalinity of a soil, expressed in pH values. The pH value and terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is the relative change in volume to be expected of soil material with changes in moisture content, that is, the extent to which the soil shrinks as it dries or swells when it is wet. Estimates are based on field observation. The extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A *high* shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Engineering Interpretations of Soils

Interpretations in table 7 are based on the engineering properties of soils shown in table 6, on test data for soils in nearby or adjoining areas, and on the experience of engineers and soil scientists with the soils of Obion County.

Soil suitability for topsoil and road fill is rated *good*, *fair*, or *poor*.

Topsoil is used for topdressing an area where vegetation is to be established and maintained. Suitability is affected mainly by ease of working and spreading the soil material, as for preparing a seedbed; by natural fertility of the material, or response of plants when fertilizer is applied; and by absence of substances toxic to plants. Texture of

interpretations—Continued

Soil features affecting—Continued					Degree and kind of limitation for septic tank filter fields
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	
Reservoir area	Embankments				
Rapidly permeable strata below a depth of 6 feet in places.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Moderate: water table at a depth of 36 inches.
Soil features favorable.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Poor drainage.....	Poor drainage; high water table; level.	Severe: poor drainage; high water table; flooding.
Rapidly permeable strata below a depth of 6 feet in places.	Adequate compaction only at optimum moisture content.	Soil features favorable.	Soil features favorable.	Soil features favorable; level.	Slight.

the soil material and its content of stone fragments are characteristics that affect suitability. Also considered is damage at the area from which topsoil is taken. In this survey, soils are rated *good* for topsoil if thickness of suitable material is more than 30 inches, *fair* if 12 to 30 inches, and *poor* if less than 12 inches. The kind of material below the excavated depth is also considered. For example, if the soil contains a dense fragipan, which would make reclamation somewhat difficult, the rating is fair, even though the material above the pan is rated good.

The only sources of sand in this county are spots of poorly graded fine sand along the Obion River.

Sources of gravel are mainly in the western half of the county. These deposits are under 20 to 30 feet of loess. Gravel of the Coastal Plain can be used economically for secondary and county roads. It is not used as an aggregate for concrete, because removing the sand, silt, and other material is a lengthy screening and washing process. Crushed limestone can be brought in cheaper than the gravel can be screened and washed. Also, the mineralogic makeup of some local gravel deposits causes a deleterious aggregate-cement reaction that results in deterioration of the concrete. This gravel, however, can be used in roadways under the crushed limestone to reduce the amount of limestone needed.

Road fill is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage and (2) the relative ease of excavating the material at borrow areas. Good material for road fill is not plentiful in the county. It occurs only in the subsoil of some soils on the Mississippi River bottoms and in the Coastal Plain deposits beneath the loess upland. The material rated good consists of sand, silt, and clay. The upland soils are fair sources for road fill. They are rich in silt but also contain a significant amount of

clay. Poor sources of road fill are those soils that contain a large amount of silt or clay. These materials are difficult to compact to the desirable density. Soils rated fair for road fill have been used successfully as the result of proper design and construction techniques.

Soil properties that most affect design and construction of roads and streets are load-supporting capacity and stability of the subgrade and the workability and quantity of cut and fill material available. The AASHTO and Unified classifications of the soil material and the shrink-swell potential indicate traffic-supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade. Many soils in the county are flooded or have a high water table. The highways built on these soils must have an embankment high enough to keep the roadway above the high water level. A few soils in the county have seepage as far down as the fragipan. Seepage can cause slumping or sliding.

Dikes and levees require soil material resistant to seepage and piping and of favorable stability, shrink-swell potential, shear strength, and compactibility. Stones and organic material in a soil are among the factors that are unfavorable.

Farm ponds are an important source of water in Obion County where there are few permanent streams. Most of the soils are suitable as reservoir sites. In some areas on the Mississippi River bottom, the soils have a sandy subsoil. These sandy spots should be removed from the reservoir area, or they should be mixed with clayey material and compacted. The upland soils are deep loess, which is good material for reservoirs but not good for embankments. The desired compaction can be obtained only when the soil material has a narrow range of moisture content. These soils have low strength and stability, and they erode easily in embankments. Most soils on first bottoms are

suitable for embankments up to about 12 feet high. They are unsuitable for embankments higher than about 12 feet, even with maximum compaction.

Drainage of cropland and pasture is affected by such soil properties as slope; permeability, texture, and structure; depth to claypan, rock, or other layers that influence rate of water movement; depth to the water table; stability in ditchbanks; susceptibility to stream overflow; salinity or alkalinity; and availability of outlets for drainage. Many of the soils in the county are poorly drained. Some could be easily drained artificially; others would be difficult to drain. The permeable soils on first bottoms, for example, Birds, Waverly, Falaya, and Convent soils, can be drained through open ditches, or tile if adequate outlets are available. Ditches are needed in clay soils and soils that have a fragipan. Tile drains work poorly in these slowly permeable soils.

Irrigation systems are used on only a few farms in the county. Irrigation of a soil is affected by such features as slope, susceptibility to stream overflow, water erosion or soil blowing, soil texture, content of stone, accumulations of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of soil layers below the surface layer and in fragipans or other layers that restrict movement of water, amount of water held available to plants, and need for drainage or depth to water table or bedrock. Most soils in the county are suitable for irrigation.

Terraces and diversions are embankments, or ridges, constructed across the slope to intercept runoff so that it soaks into the soil or flows slowly to the prepared outlet. Using terraces and diversions, especially diversions, is an important practice on many sloping soils. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock or other unfavorable material; presence of stones; permeability; and resistance to water erosion, soil slipping, and soil blowing. A soil suitable for these structures provides outlets for runoff where vegetation can be easily established.

In table 7 the soils of Obion County are rated according to the degree and kind of limitation for septic tank filter fields. Soil limitations are indicated by the ratings slight, moderate, and severe. *Slight* means soil properties generally favorable for the rated use, or in other words, limitations that are minor and easily overcome. *Moderate* means that some soil properties are unfavorable but can be overcome or modified by special planning and design. *Severe* means soil properties are so unfavorable and so difficult to correct or overcome as to require major soil reclamation and special designs. For some uses, the rating of severe is divided to obtain ratings of severe and very severe. *Very severe* means one or more soil properties are so unfavorable for a particular use that overcoming the limitations is most difficult and costly and commonly not practical for the specified use.

Septic tank filter fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that

affects difficulty of layout and construction and also the risk of soil erosion, lateral seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Only well-drained soils that are not subject to flooding are used for septic tank filter fields. Permeability and slope are other factors considered. Soils that have a slope gradient of more than about 10 percent, as in a few areas of Memphis soil, are rated as having severe limitations, though other properties are favorable.

Formation and Classification of the Soils

The soils in Obion County differ from place to place. They differ for many reasons, not all of which are known. The characteristics of the soil at any given place depend on the nature of the parent material and the effects of the other soil-forming factors.

Let us consider what the area was like before, during, and after the ice age more than one million years ago. The present soils had not yet begun to form. The entire county was under water. It was part of the gulf that extended up the Mississippi Valley into what is now Southern Illinois. About one million years ago, ice began to form on the area that is now the northern part of the United States and Canada. As these ice sheets, or glaciers, became larger, they enclosed large volumes of water from the oceans and the gulf. Consequently, the water receded, the shoreline dropped in elevation, and the Mississippi Valley and Obion County were exposed.

Soil formation began in the exposed Coastal Plain deposits. In general, the soils were redder, more sandy, and more strongly leached than the present ones, which are siltier and more fertile. They were on rolling uplands much like the present topography of Obion County. Sluggish streams meandered through broad, flat bottom lands that dissected the uplands.

Probably the bottom land along the Mississippi River was much lower than it is today. It was swampy and the river channels left sloughs and oxbow lakes that remain today. The Mississippi River channel was west of its present location, and the Ohio River flowed along the western edge of the county.

The bottom land along the Mississippi River received sediments washed from the surrounding area. The main accumulation resulted from glacial activity. The large volume of water carried loose soil materials down to the bottom land. Strong, westerly winds lifted the sediments and moved them east, then dropped the largest particles within a few miles on what is now Obion County. Deposits of this material, called Loveland Loess, accumulated to a thickness of several feet.

Deposition slowed down, and a fairly long period of soil formation began. Some of the loess washed away, and the remaining layer was of uneven thickness. Weathering and processes of soil formation produced soils, now buried, that had more definite layers and lower fertility than the present soils.

After several thousand years, another warming trend occurred. More silt-loaded waters flooded the bottom land along the Mississippi River. When the water receded, the

wind deposited another layer, Farmdale Loess, on top of Loveland Loess. Deposition stopped for a short period, and soil formation lasted only long enough to produce minor changes in the Farmdale Loess. In places, erosion removed all of this loess layer.

When the glaciers began to melt for a third time, more floods occurred and more sediment was deposited. Then the wind deposited a layer, called Peorian Loess. A blanket of this loess about 3 to 50 feet thick covered all the uplands and in places the outer edge of the flood plains. Peorian Loess was the parent material of the soils that now cover the uplands of Obion County.

Formation of the Soils

The nature of a soil at any given point is determined by the combined influence of the five soil-forming factors—parent material, climate, living organisms, relief, and time. All five of these factors affect the formation of every soil, but the importance of each differs from place to place.

Parent material, relief, and time have strongly influenced soil formation in Obion County. Climate is uniform over the county and does not account for major differences among soils. Living organisms, also, have influenced soil development, but they have not caused significant differences.

Loess and alluvium were the parent materials of most of the soils in the county. The loess hills that cover most of the county are in sharp contrast with the alluvial bottom lands along the Mississippi River and the Obion River.

The following paragraphs describe both the loess hills and the alluvial bottom lands. They tell how the soil-forming factors, particularly parent material, relief, and time, have influenced the soils.

Loess hills.—This area is made up mostly of rolling and steep hills dissected by stream bottoms. Flat uplands are intermingled with the hills, and low, flat uplands are along many first bottoms.

Peorian Loess was the parent material of the soils in this area. It is as much as 50 feet thick in the western part of the uplands. It becomes progressively thinner toward the east, and in some places along the eastern edge of the county is about 3 feet thick. In most places it is underlain by Farmdale Loess. When Peorian Loess was deposited, it was gray or yellowish brown. It was rich in bases, mostly calcium carbonate, and alkaline in reaction. The soil particles were mainly coarse silt, and they were uniform in size.

Heavy rainfall and forest vegetation cause intense leaching and movement of soluble and colloidal materials downward in the soil. Consequently, much of the calcium carbonate and other bases is leached out, and the soils are now acid. Clay has been washed down from the upper 8 to 12 inches into the subsoil. Thus, the subsoil is finer textured and is the zone of highest clay content. The leaching of soluble minerals and the accumulation of iron and other less soluble materials in the subsoil account for the fact that well-drained, well-aerated soils, such as Memphis and Loring, are slightly redder than the underlying material. The leaching of soluble minerals and the downward movement of clay have taken place over a period of several thousand years.

Relief, or lay of the land, is the cause of major differences among the soils on uplands. It also determines the kind of vegetation.

The moderately well drained Loring soils and the well drained Memphis soils formed on hills and ridges, where excess water drains away readily. Early settlers found oak, hickory, black walnut, and many yellow-poplar trees on these hills and ridges.

The grayish, poorly drained Routon, Fountain, De-koven, and Bonn soils developed in low, flat depressions from which water drains away slowly. The soil material was waterlogged much of the time; thus, air was prevented from entering and oxidizing the soils, or turning them brown. The absence of air resulted in reduction, or gleying, which causes the gray colors characteristic of these soils.

Grenada, Calloway, and Center soils formed in areas of intermediate relief and position. In drainage and aeration, these soils are intermediate between the well-drained Memphis soils and the poorly drained Routon soils.

Level to steep soils that have a fragipan cover a large part of the loess hills. The fragipan is silt loam or silty clay loam and ranges from faint and weakly developed, as in Loring soils, to very firm, dense, and well developed, as in Grenada and Calloway soils.

During each rain, some of the Peorian Loess was carried from the uplands to first bottoms. Also some was spread on the Mississippi River bottoms along the western edge of the county. The soils on bottom lands are young and show only slight evidence of soil formation. Nevertheless, differences in relief have caused some important differences among these soils. The brown, well-aerated soils, such as Morganfield soils, formed in areas at higher elevation, which have good drainage. In places where water drains away more slowly, the mottled grayish Falaya and Convent soils formed. In low places where water collects, the grayish, poorly aerated Waverly and Birds soils formed.

Mississippi River bottoms.—Alluvium is the parent material of the soils on the Mississippi River bottoms, which cover only a narrow strip along the western edge of Obion County. The alluvium washed from soils that formed in material weathered from many kinds of rock, from glacial drift, and from marine deposits. It contains a number of different minerals, many of which are only partly weathered.

The soils of the Mississippi River bottoms differ widely in texture. As the swift water flows over the riverbank, it carries all sizes of soil particles. The largest particles, which are sand grains, are dropped along the channel. The medium-size, or silt, particles are dropped as the water continues to spread. The smallest, clay-size particles are dropped only after the water drains to low spots where it remains still. The deposits of coarse- and medium-size soil particles next to channels are called natural levees. Commerce soils are on intermediate positions and are somewhat poorly drained. At a distance from the channel, in low places where the water is ponded, clay is deposited. The poorly drained, poorly aerated Sharkey and Iberia soils formed in the lowest part of these areas. Bowdre soils, which are somewhat poorly drained, formed on the slight rises and ridges within these low places.

This pattern, however, of medium- or coarse-textured sediment next to the channels and clay deposits at a distance no longer exists. The meandering river channel

shifts from one place to another. Consequently, segments of natural levees are washed away and the medium-textured soil material is deposited on clayey soil material.

The influence of time and relief has resulted in major differences in the soils along the Mississippi River. Since the river has shifted to the west, deposits of clayey sediment accumulated in the former channels and sloughs. At the same time, soil-forming processes have been active in the remaining segments of the natural levees, which are now called "old natural levees."

Well-developed soils formed on the old natural levees. The grayish, poorly drained, poorly aerated Forestdale soils, which have a clayey subsoil, formed in the low, flat areas. Reelfoot soils formed in the slightly higher, better drained and aerated areas. The well drained Worthen soils and the moderately well drained Tiptonville soils formed on the highest parts of the old natural levees where drainage and aeration are good. About half the bottom land along the Mississippi River has been covered by recent loamy sediments from the nearby loess hills. Adler, Birds, Convent, Dekoven, and Morganfield are examples of soils that formed in these loamy sediments.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories,

so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (2) and revised later (4). The system currently used by the National Cooperative Soil Survey was developed in the early sixties (3) and adopted in 1965 (6). It is under continual study.

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the subgroup, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 8 shows the classification of each soil series of Obion County by family, subgroup, and order, according to the current system.

Following are brief descriptions of each of the categories of the current system, as shown in table 8.

Order.—Ten soil orders are recognized in the current system of classification. They are Alfisols, Aridisols, Entisols, Histosols, Inceptisols, Mollisols, Oxisols, Spodosols, Ultisols, and Vertisols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Three exceptions are Entisols, Histosols, and Inceptisols, which occur in many climates. Four soil orders are represented in Obion County. They are Alfisols, Entisols, Inceptisols, and Mollisols.

Suborder.—Each order is divided into suborders, primarily on the basis of soil characteristics that produce

TABLE 8.—*Soil series classified according to the current system of classification*

Series	Family	Subgroup	Order
Adler.....	Coarse-silty, mixed, nonacid, thermic.....	Aquic Udifluvents.....	Entisols.
Birds ¹	Fine-silty, mixed, nonacid, mesic.....	Typic Fluvaquents.....	Entisols.
Bonn.....	Fine-silty, mixed, thermic.....	Glossic Natraqualfs.....	Alfisols.
Bowdre.....	Clayey over loamy, mixed, thermic.....	Fluvaquentic Hapludolls.....	Mollisols.
Calloway.....	Fine-silty, mixed, thermic.....	Glossaic Fragiudalfs.....	Alfisols.
Center.....	Fine-silty, mixed, thermic.....	Aquic Hapludalfs.....	Alfisols.
Collins.....	Coarse-silty, mixed, acid, thermic.....	Aquic Udifluvents.....	Entisols.
Commerce.....	Fine-silty, mixed, nonacid, thermic.....	Aeric Fluvaquents.....	Entisols.
Convent.....	Coarse-silty, mixed, nonacid, thermic.....	Aeric Fluvaquents.....	Entisols.
Dekoven.....	Fine-silty, mixed, thermic.....	Fluventic Haplaquolls.....	Mollisols.
Falaya ²	Coarse-silty, mixed, acid, thermic.....	Aeric Fluvaquents.....	Entisols.
Forestdale.....	Fine, montmorillonitic, thermic.....	Typic Ochraqualfs.....	Alfisols.
Fountain.....	Fine-silty, mixed, thermic.....	Typic Glossaqualfs.....	Alfisols.
Grenada.....	Fine-silty, mixed, thermic.....	Glossic Fragiudalfs.....	Alfisols.
Iberia.....	Fine, montmorillonitic, thermic.....	Vertic Haplaquolls.....	Mollisols.
Loring.....	Fine-silty, mixed, thermic.....	Typic Fragiudalfs.....	Alfisols.
Memphis.....	Fine-silty, mixed, thermic.....	Typic Hapludalfs.....	Alfisols.
Morganfield.....	Coarse-silty, mixed, nonacid, thermic.....	Typic Udifluvents.....	Entisols.
Reelfoot.....	Fine-silty, mixed, thermic.....	Aquic Argiudolls.....	Mollisols.
Routon.....	Fine-silty, mixed, thermic.....	Typic Ochraqualfs.....	Alfisols.
Sharkey.....	Very fine, montmorillonitic, nonacid, thermic.....	Vertic Haplaquepts.....	Inceptisols.
Tiptonville.....	Fine-silty, mixed, thermic.....	Typic Argiudolls.....	Mollisols.
Waverly.....	Coarse-silty, mixed, acid, thermic.....	Typic Fluvaquents.....	Entisols.
Worthen ³	Fine-silty, mixed, mesic.....	Cumulic Hapludolls.....	Mollisols.

¹ The Birds soils in Obion County are taxajuncts to the Birds series. They are a few degrees warmer than is defined in the range for the series.

² Since correlation, the Falaya soils have been reclassified as Aeric Ochraqualfs.

³ The Worthen soils in Obion County are taxajuncts to the Worthen series. They have a thinner, darker colored surface layer than is defined in the range for the series; the annual temperature is also a few degrees warmer.

classes having genetic similarity. A suborder has a narrower climatic range than an order. The criteria for suborders reflect either the presence or absence of waterlogging or soil differences resulting from climate or vegetation.

Great group.—Each suborder is divided into great groups on the basis of uniformity in the kind and sequence of genetic horizons.

Subgroup.—Each great group is divided into subgroups, one representing the central (typic) concept of the group, and others, called intergrades, made up of soils that have mostly the properties of one great group but also one or more properties of another great group.

Family.—Families are established within subgroups, primarily on the basis of properties important to plant growth. Some of these properties are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

Literature Cited

- (1) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS.
1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., illus.
- (2) BALDWIN, MARK, KELLOGG, CHARLES E., AND THORP, JAMES.
1988. SOIL CLASSIFICATION. U.S. Dept. Agr. Ybk., pp. 979-1001, illus.
- (3) SIMONSON, ROY W.
1962. SOIL CLASSIFICATION IN THE UNITED STATES. Sci. 137: 1027-1034, illus.
- (4) THORP, JAMES AND SMITH, GUY D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117-126.
- (5) UNITED STATES DEPARTMENT OF AGRICULTURE.
1961. SOIL SURVEY MANUAL. U.S. Dept. Agr. Handbook No. 18, 503 pp., illus.
- (6) ———
1960. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. 265 pp., illus. [Supplements issued in March 1967 and September 1968]
- (7) ———
1962. FOREST STATISTICS FOR TENNESSEE COUNTIES. South. Forest Expt. Sta. Supplement to Forest Survey Release No. 86, 11 pp.
- (8) UNITED STATES DEPARTMENT OF DEFENSE.
1968. UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS. MIL-STD-619B, 30 pp., illus.

Glossary

Acidity, soil. See Reaction, soil.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Drainage class (natural). Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and some soils commonly have mottling at a depth below 6 to 16 inches.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors such as light, moisture, temperature, and the physical condition of the soil are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the

material is known to be different from that in the *solum*, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Leaching. The removal of soluble materials from soils or other material by percolating water.

Loess. A fine-grained eolian deposit consisting dominantly of silt-sized particles.

Mottling, soil. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are these: *fine*, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium*, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse*, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality that enables the soil to transmit water or air. Terms used to describe permeability are as follows: *very slow*, *slow*, *moderately slow*, *moderate*, *moderately rapid*, *rapid*, and *very rapid*.

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

pH		pH	
Extremely acid----	Below 4.5	Neutral -----	6.6 to 7.3
Very strongly acid--	4.5 to 5.0	Mildly alkaline----	7.4 to 7.8
Strongly acid-----	5.1 to 5.5	Moderately alkaline--	7.9 to 8.4
Medium acid-----	5.6 to 6.0	Strongly alkaline----	8.5 to 9.0
Slightly acid-----	6.1 to 6.5	Very strongly	9.1 and
		alkaline.	higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Sand. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Second bottom. The first terrace above the normal flood plain of a stream.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower

limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum. **Surface soil.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For complete information about a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. For complete information about a capability unit, read both the introduction to "Use of the Soils for Crops and Pasture" and the description of the capability unit in this section. For information about the suitability of soils for woodland and wildlife, read the introduction to these sections and refer to the tables in each section. Other information is given in tables as follows:

Approximate acreage and proportionate extent of soils, table 2, page 11.
Estimated yields, table 3, page 38.
Suitability of soils as wildlife habitat, table 4, page 39.

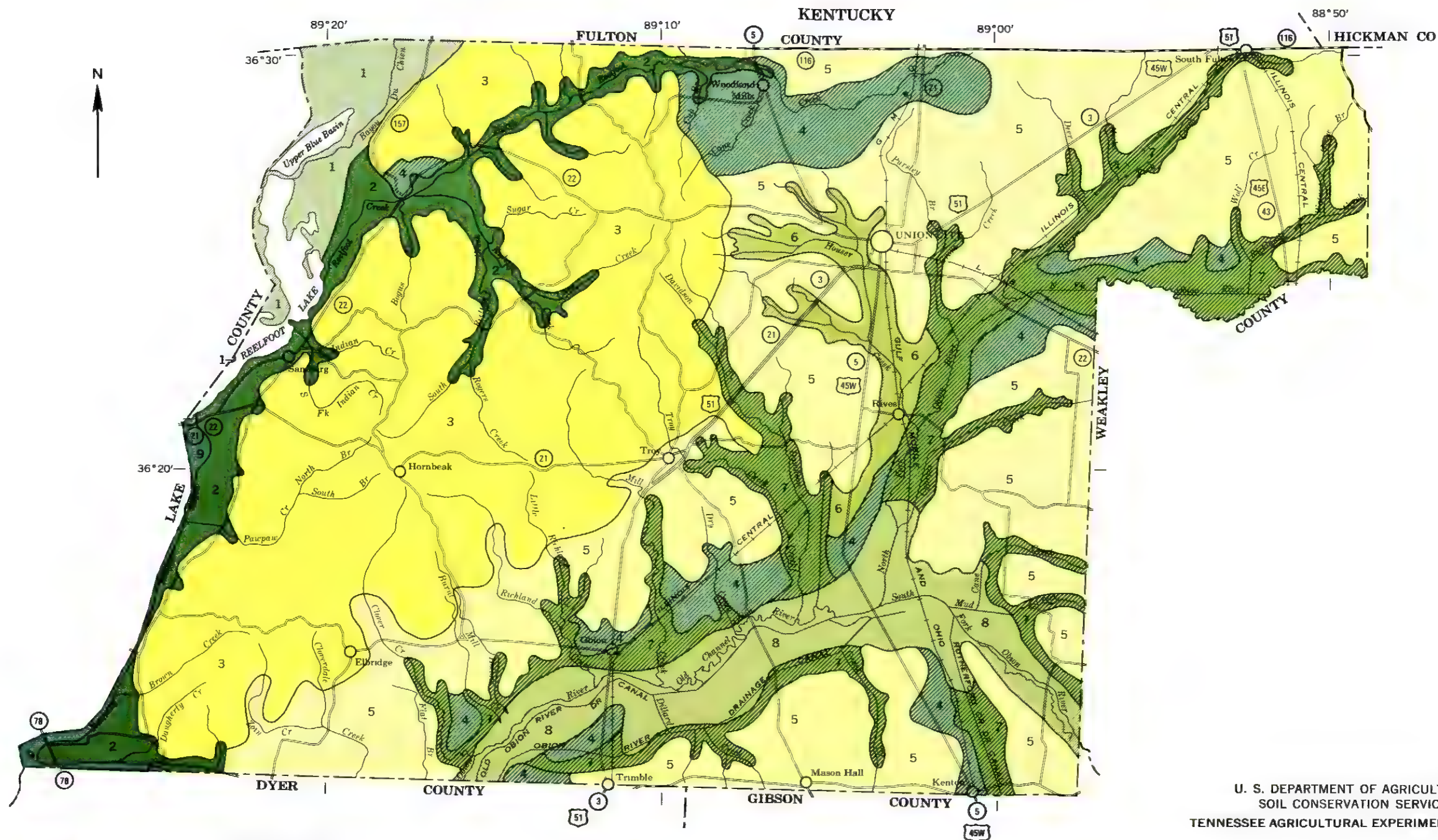
Use of soils for woodland, table 5, page 42.
Use of soils in engineering, tables 6 and 7, pages 44 through 53.

Map symbol	Mapping Unit	Described on page	Capability unit		Woodland group
			Symbol	Page	Number
Ad	Adler silt loam-----	11	I-1	32	1o4
Bd	Birds silt loam-----	11	IIIw-3	35	2w6
Bo	Bowdre silty clay-----	13	IIIw-4	35	2w5
Ca	Calloway silt loam-----	14	IIIw-1	33	2w5
Ce	Center silt loam-----	14	IIw-1	33	2w5
Cl	Collins silt loam-----	15	I-1	32	1o4
Cm	Commerce silt loam-----	15	IIw-1	33	1w5
Cn	Convent silt loam-----	16	IIw-1	33	1w5
Dk	Dekoven silt loam-----	16	IIw-1	33	1w5
Fa	Falaya silt loam-----	17	IIw-1	33	1w5
Fb	Falaya silt loam, frequently flooded-----	17	VIIw-1	36	1w6
Fd	Forestdale silt loam-----	18	IIIw-2	34	1w6
Fe	Forestdale silty clay loam-----	18	IIIw-2	34	1w6
Fn	Fountain silt loam-----	19	IIIw-3	35	1w6
GrB	Grenada silt loam, 2 to 5 percent slopes-----	19	IIe-2	32	3o7
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded---	19	IIIe-2	33	3o7
GrC	Grenada silt loam, 5 to 8 percent slopes-----	20	IIIe-2	33	3o7
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded---	20	IVe-2	35	3o7
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded---	20	VIe-2	36	3o7
Gu	Gullied land-----	20	VIIe-2	36	---
Ie	Iberia silty clay loam-----	21	IIIw-2	34	2w6
LoB	Loring silt loam, 2 to 5 percent slopes-----	21	IIe-1	32	3o7
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded---	22	IIIe-1	33	3o7
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded---	22	IIIe-1	33	3o7
LoD	Loring silt loam, 8 to 12 percent slopes-----	22	IVe-1	35	3o7
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded---	22	IVe-1	35	3o7
LoE2	Loring silt loam, 12 to 20 percent slopes, eroded---	22	VIe-1	36	3o7
MfB	Memphis silt loam, 2 to 5 percent slopes-----	24	IIe-1	32	2o7
MfB2	Memphis silt loam, 2 to 5 percent slopes, eroded---	24	IIe-1	32	2o7
MfC	Memphis silt loam, 5 to 8 percent slopes-----	24	IIIe-1	33	2o7
MfC2	Memphis silt loam, 5 to 8 percent slopes, eroded---	24	IIIe-1	33	2o7
MfD2	Memphis silt loam, 8 to 12 percent slopes, eroded---	24	IVe-1	35	2o7
MfE2	Memphis silt loam, 12 to 20 percent slopes, eroded---	24	VIe-1	36	2o7
MfF2	Memphis silt loam, 20 to 30 percent slopes, eroded---	25	VIe-1	36	2r8
MfG	Memphis silt loam, 30 to 50 percent slopes-----	26	VIIe-1	36	2r8
MgF	Memphis soils-Gullied land complex, 12 to 30 percent slopes-----	26	VIIe-1	36	2r8
Mo	Morganfield silt loam-----	26	I-1	32	1o4
Re	Reelfoot silt loam-----	27	IIw-1	33	2o4
Rt	Routon silt loam-----	27	IIIw-3	35	1w6
Ru	Routon-Bonn silt loams-----	27	IIIw-3	35	1w6
Sa	Sharkey clay-----	28	IIIw-2	34	3w6
Sm	Smoothed land, Memphis soil material-----	28	VIe-1	36	2r8
Sw	Swamp-----	28	VIIw-1	36	4w6
Ta	Tiptonville silt loam-----	29	I-1	32	2o4
Ws	Waverly silt loam-----	29	IIIw-3	35	2w6
Wt	Waverly silt loam, frequently flooded-----	30	VIIw-1	36	2w6
Wu	Worthen silt loam-----	31	I-1	32	1o4

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ASSOCIATIONS*

- 1** Swamp-Bowdre-Sharkey association: Swampy land and somewhat poorly drained and poorly drained, level, clayey soils on the Mississippi River bottoms
- 2** Adler-Convent-Falaya association: Moderately well drained and somewhat poorly drained, level, loamy soils on first bottoms
- 3** Memphis association: Well-drained, rolling to steep, loamy soils on uplands
- 4** Routon-Calloway-Center association: Poorly drained and somewhat poorly drained, level, loamy soils on uplands
- 5** Grenada-Loring-Memphis association: Moderately well drained and well drained, undulating to hilly, loamy soils on uplands

- 6** Fountain-Dekoven-Center association: Poorly drained and somewhat poorly drained, level, loamy soils in Houser Valley
- 7** Falaya-Waverly-Collins association: Poorly drained to moderately well drained, level, loamy soils on first bottoms
- 8** Waverly-Falaya-Swamp association: Poorly drained and somewhat poorly drained, level, loamy soils and swampy land on first bottoms
- 9** Iberia-Sharkey-Forestdale association: Poorly drained, level, clayey and loamy soils on the Mississippi River bottoms

*Texture refers to surface layer of major soils in each association.

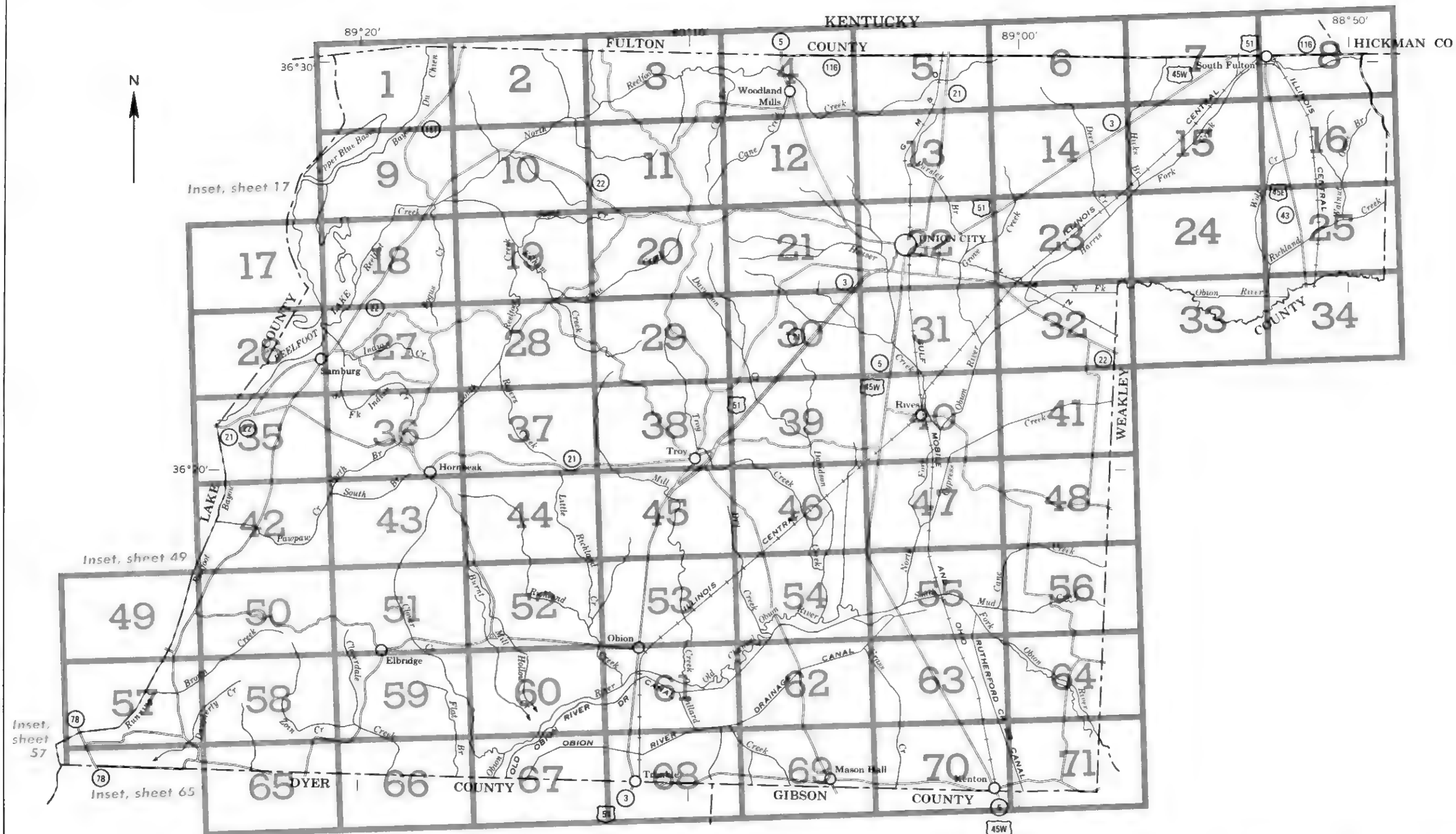
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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TENNESSEE AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP OBION COUNTY, TENNESSEE

Scale 1:190,080
1 0 1 2 3 4 Miles

This map is for general planning. It shows only the major soils and does not contain sufficient detail for operational planning.



INDEX TO MAP SHEETS OBION COUNTY, TENNESSEE

Scale 1:190,080
1 0 1 2 3 4 Miles

Original text from each map sheet:

"This map is one of a set compiled in 1971 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Tennessee Agricultural Experiment Station. Photobase from 1965 aerial photography. Positions of grid lines are approximate and based on the Tennessee coordinate system, west zone."

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, B, C, D, E, F, or G, shows the slope. Symbols of nearly level soils, such as Collins silt loam, do not contain a slope letter. Neither do the symbols for some land types that have a considerable range in slope, such as Gullied land. The number, 2, in the symbol indicates that the soil is eroded.

SYMBOL	NAME
Ad	Adler silt loam
Bd	Birds silt loam
Ba	Bowdre silty clay
Ca	Calloway silt loam
Ce	Center silt loam
Cl	Collins silt loam
Cm	Commerce silt loam
Cn	Convent silt loam
Dk	Dekoven silt loam
Fa	Falaya silt loam
Fb	Falaya silt loam, frequently flooded
Fd	Forestdale silt loam
Fe	Forestdale silty clay loam
Fn	Fountain silt loam
GrB	Grenada silt loam, 2 to 5 percent slopes
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
GrC	Grenada silt loam, 5 to 8 percent slopes
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded
Gu	Gullied land
Ie	Iberia silty clay loam
LoB	Loring silt loam, 2 to 5 percent slopes
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded
LoD	Loring silt loam, 8 to 12 percent slopes
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded
LoE2	Loring silt loam, 12 to 20 percent slopes, eroded
MfB	Memphis silt loam, 2 to 5 percent slopes
MfB2	Memphis silt loam, 2 to 5 percent slopes, eroded
MfC	Memphis silt loam, 5 to 8 percent slopes
MfC2	Memphis silt loam, 5 to 8 percent slopes, eroded
MfD2	Memphis silt loam, 8 to 12 percent slopes, eroded
MfE2	Memphis silt loam, 12 to 20 percent slopes, eroded
MfF2	Memphis silt loam, 20 to 30 percent slopes, eroded
MfG	Memphis silt loam, 30 to 50 percent slopes
MgF	Memphis soils-Gullied land complex, 12 to 30 percent slopes
Mo	Morganfield silt loam
Re	Reelfoot silt loam
Rt	Rauton silt loam
Ru	Routon-Bann silt loams
Sa	Sharkey clay
Sm	Smoothed land, Memphis soil material
Sw	Swamp
Ta	Tiptonville silt loam
Ws	Waverly silt loam
Wt	Waverly silt loam, frequently flooded
Wu	Warthen silt loam

WORKS AND STRUCTURES

Highways and roads	
Dual	
Good motor	
Poor motor	
Trail	
Highway markers	
National Interstate	
U. S.	
State or county	
Railroads	
Single track	
Multiple track	
Abandoned	
Bridges and crossings	
Road	
Trail	
Railroad	
Ferry	
Ford	
Grade	
R. R. over	
R. R. under	
Tunnel	
Buildings	
School	
Church	
Mine and quarry	
Gravel pit	
Power line	
Pipeline	
Cemetery	
Dams	
Levee	
Tanks	
Well, oil or gas	
Forest fire or lookout station	
Windmill	

CONVENTIONAL SIGNS

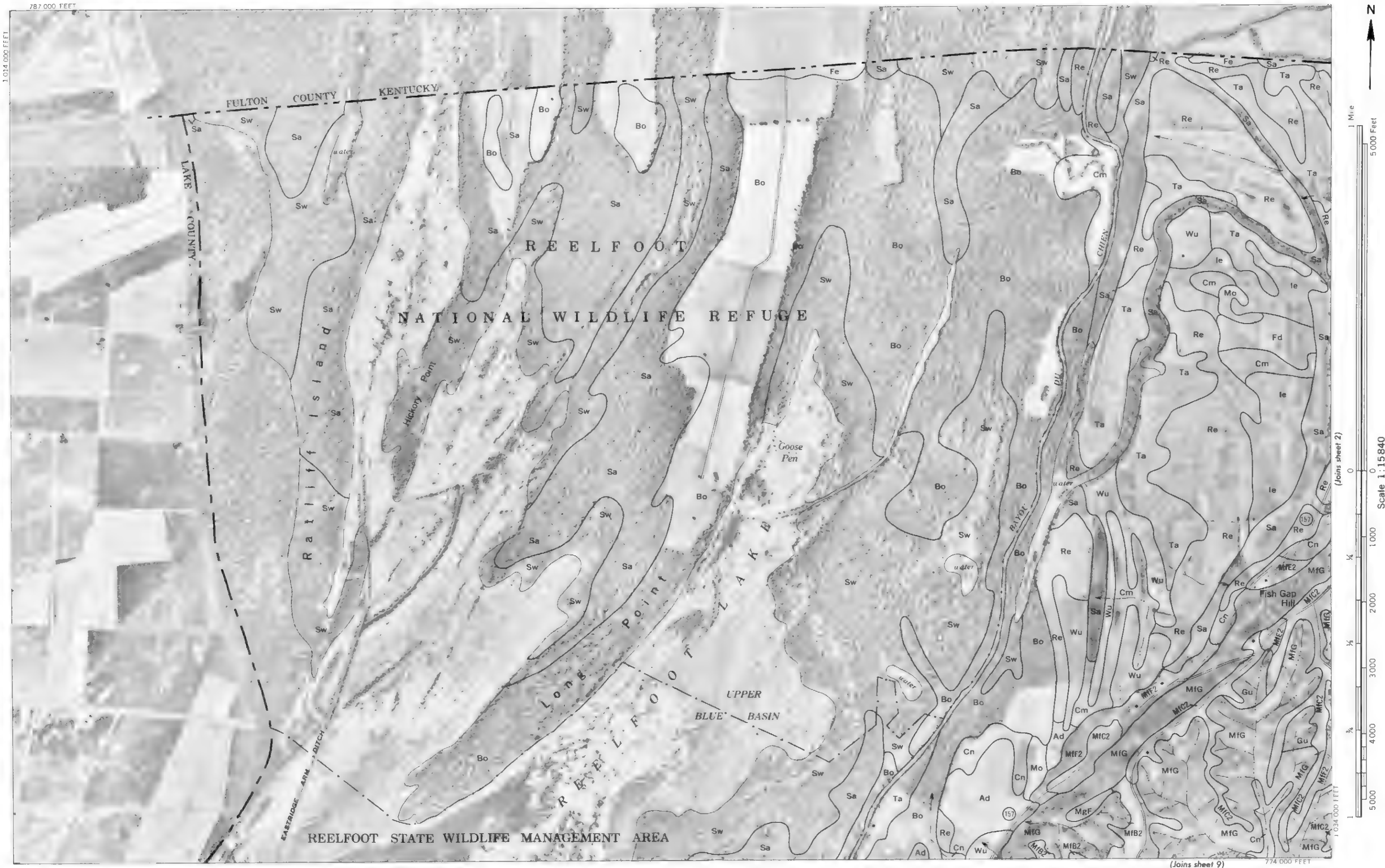
BOUNDARIES	
National or state	
County	
Reservation	
Land grant	
Small park, cemetery, airport	
DRAINAGE	
Streams, double-line	
Perennial	
Intermittent	
Streams, single-line	
Perennial	
Intermittent	
Crossable with tillage implements	
Not crossable with tillage implements	
Unclassified	
Canals and ditches	
Lakes and ponds	
Perennial	
Intermittent	
Spring	
Marsh or swamp	
Wet spot	
Alluvial fan	
Drainage end	

RELIEF

Escarpments	
Bedrock	
Other	
Prominent peak	
Depressions	
Crossable with tillage implements	
Not crossable with tillage implements	
Contains water most of the time	

SOIL SURVEY DATA

Soil boundary	
and symbol	
Gravel	
Stoniness	
Stony	
Very stony	
Rock outcrops	
Chert fragments	
Clay spot	
Sand spot	
Gumbo or slick spot	
Made land	
Severely eroded spot	
Blowout, wind erosion	
Gully	
Short steep slope	



2



1 Mile

5000 Feet

0

1000

2000

3000

4000

5000

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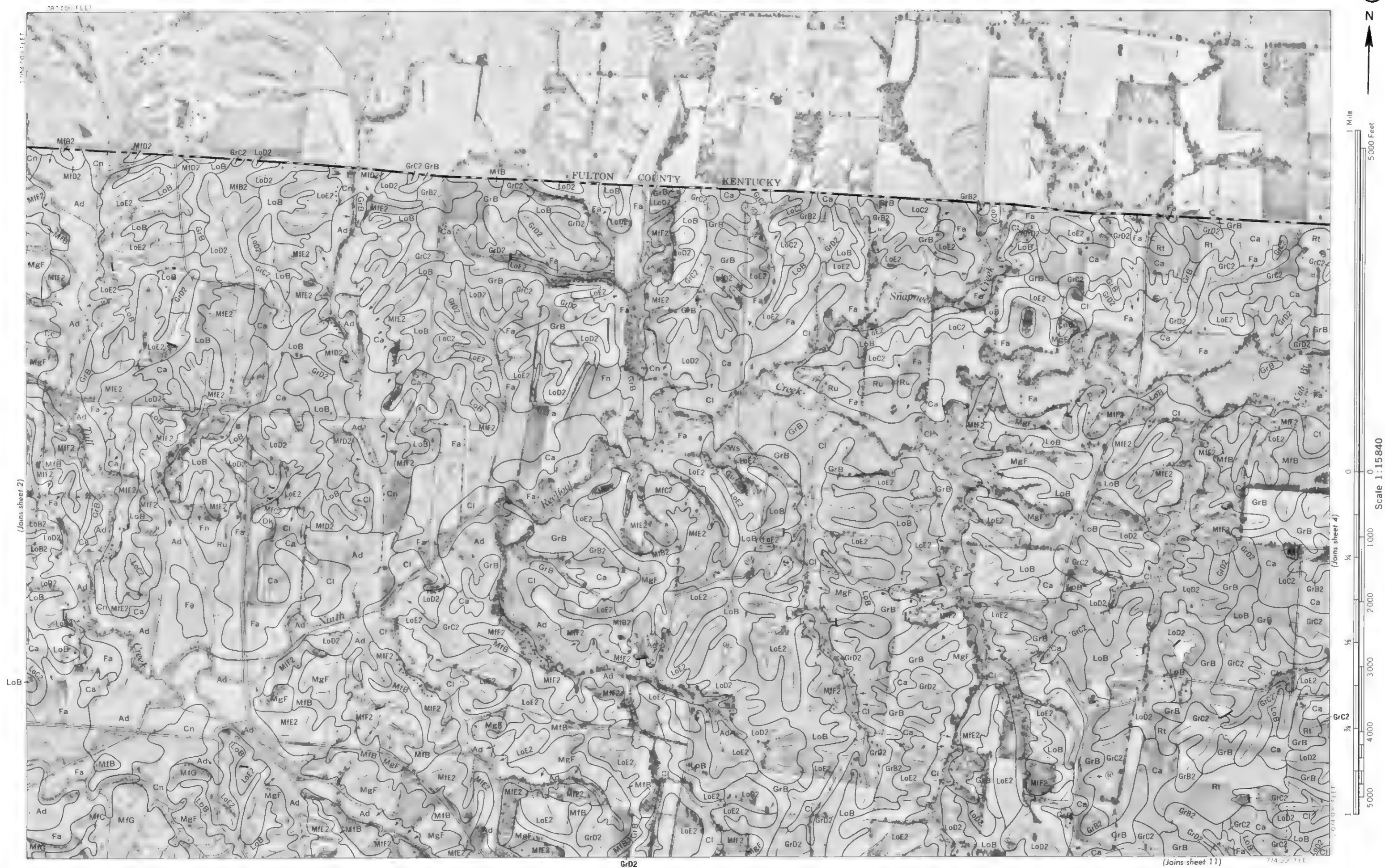
333

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336

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1 Mile

5000 Feet



Scale 1:15840

(Joins sheet 3)

(Joins sheet 12)

FULTON COUNTY KENTUCKY

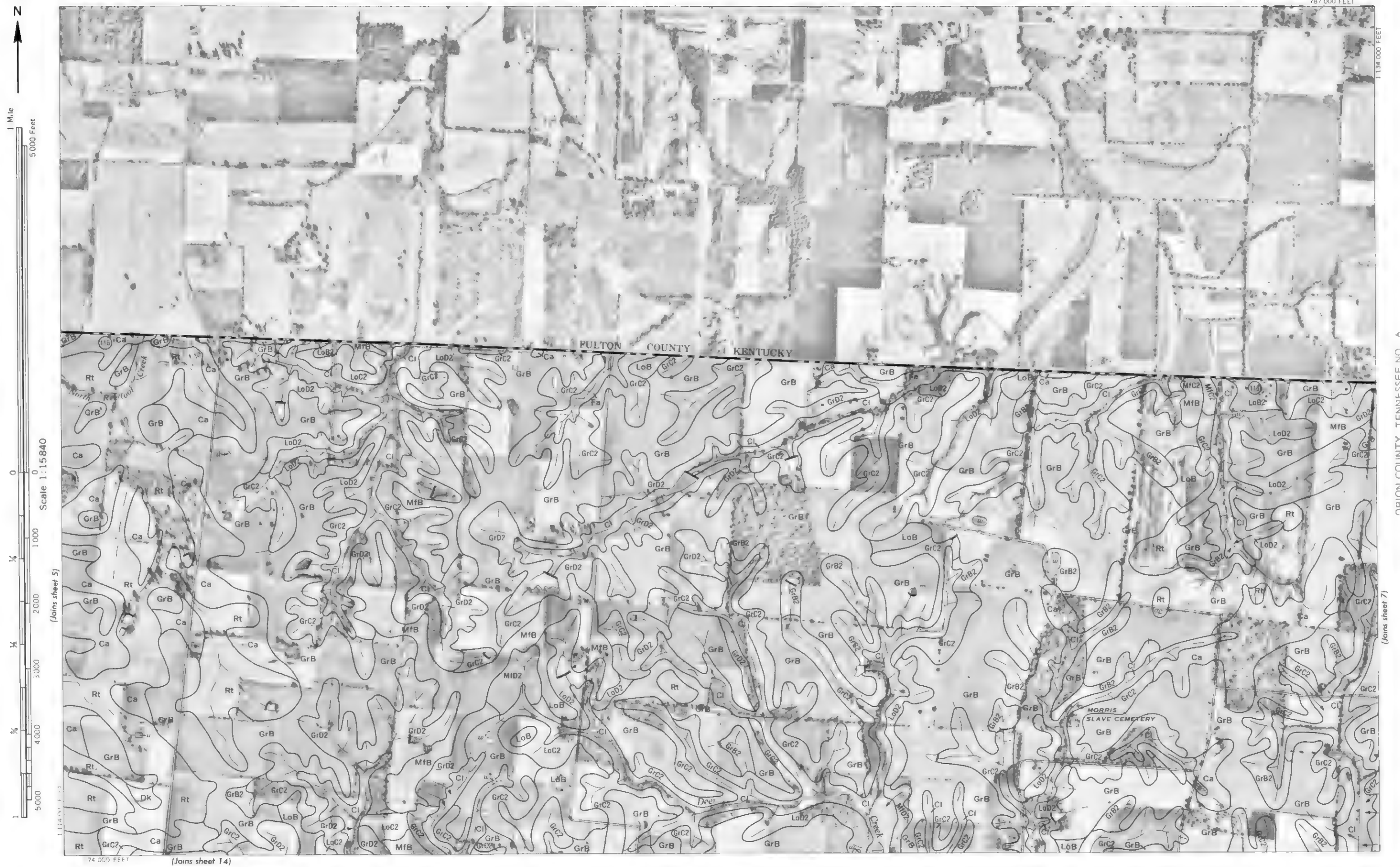
St Johns Church

Woodland Mills

OBION COUNTY, TENNESSEE NO. 4

(Joins sheet 5)







(Joins sheet 6)

(Joins sheet 8)

(Joins sheet 15)

787 000 FEET

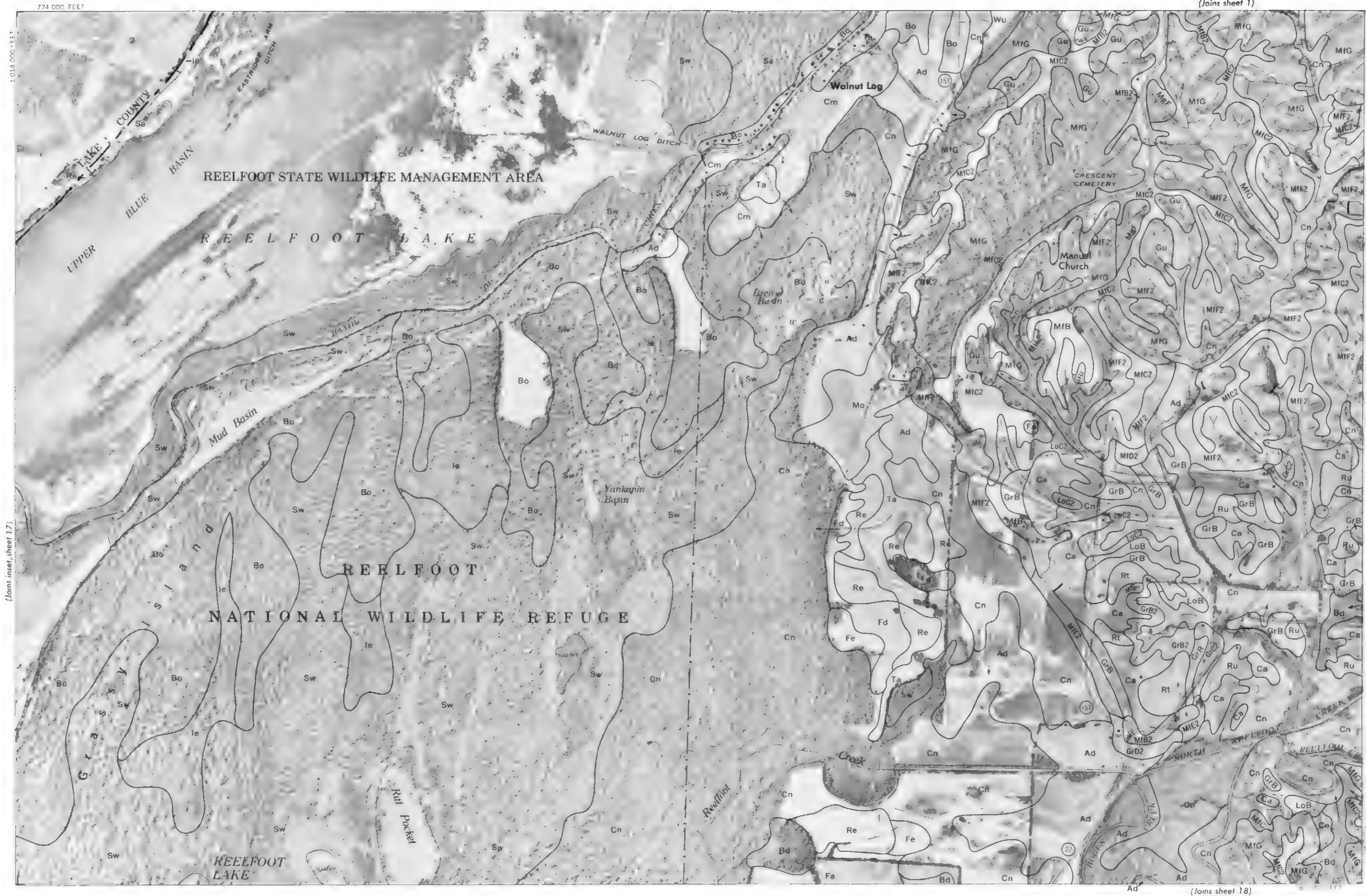


1 Mile
5000 Feet

Scale 1:15840
0 1000 2000 3000 4000 5000
(Joins sheet 7)
(Joins sheet 16)



OBION COUNTY, TENNESSEE NO. 9



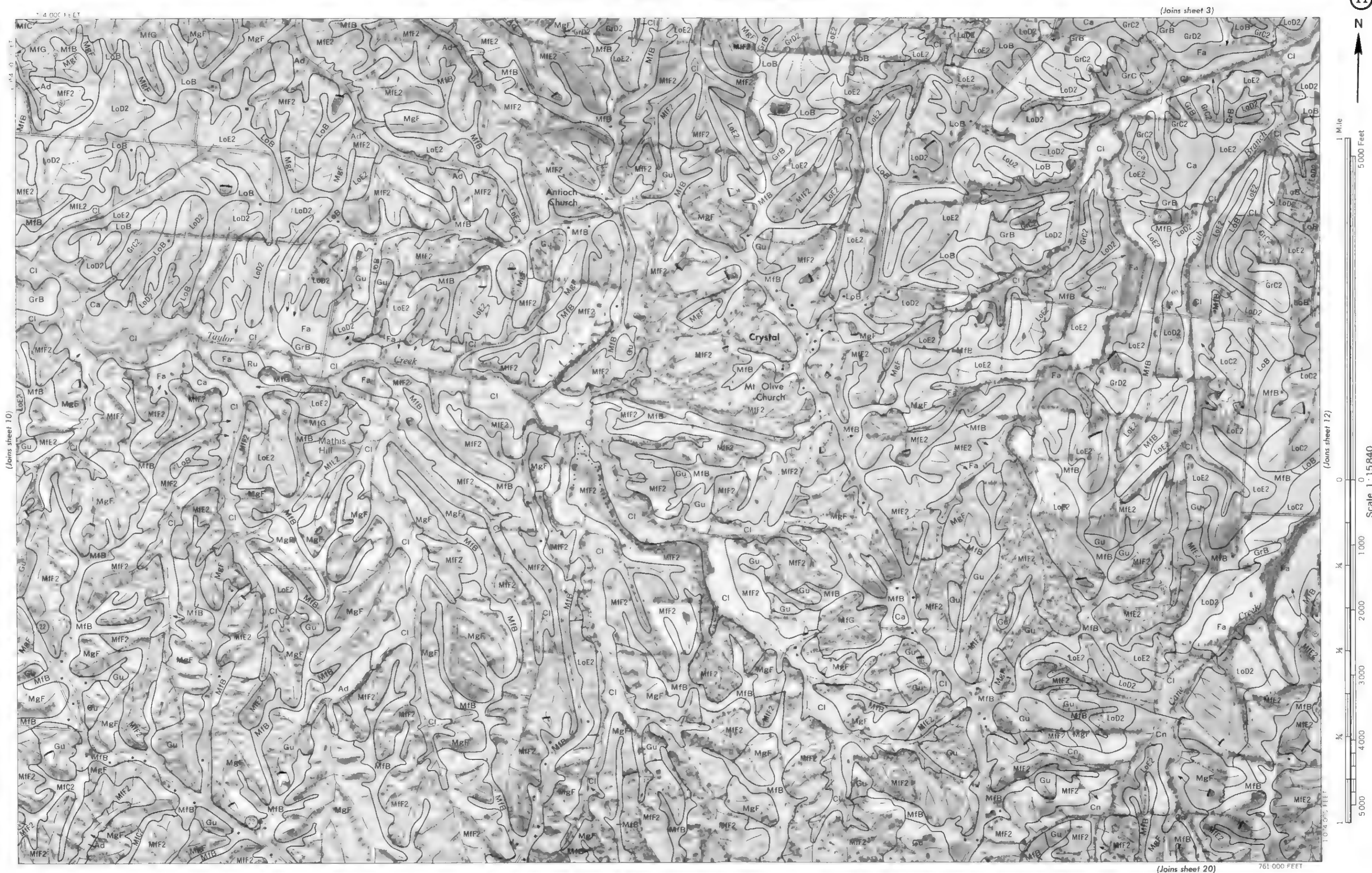
74 00' FEET



1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	2028-2029	2029-2030	2030-2031	2031-2032	2032-2033	2033-2034	2034-2035	2035-2036	2036-2037	2037-2038	2038-2039	2039-2040	2040-2041	2041-2042	2042-2043	2043-2044	2044-2045	2045-2046	2046-2047	2047-2048	2048-2049	2049-2050	2050-2051	2051-2052	2052-2053	2053-2054	2054-2055	2055-2056	2056-2057	2057-2058	2058-2059	2059-2060	2060-2061	2061-2062	2062-2063	2063-2064	2064-2065	2065-2066	2066-2067	2067-2068	2068-2069	2069-2070	2070-2071	2071-2072	2072-2073	2073-2074	2074-2075	2075-2076	2076-2077	2077-2078	2078-2079	2079-2080	2080-2081	2081-2082	2082-2083	2083-2084	2084-2085	2085-2086	2086-2087	2087-2088	2088-2089	2089-2090	2090-2091	2091-2092	2092-2093	2093-2094	2094-2095	2095-2096	2096-2097	2097-2098	2098-2099	2099-2100	2100-2101	2101-2102	2102-2103	2103-2104	2104-2105	2105-2106	2106-2107	2107-2108	2108-2109	2109-2110	2110-2111	2111-2112	2112-2113	2113-2114	2114-2115	2115-2116	2116-2117	2117-2118	2118-2119	2119-2120	2120-2121	2121-2122	2122-2123	2123-2124	2124-2125	2125-2126	2126-2127	2127-2128	2128-2129	2129-2130	2130-2131	2131-2132	2132-2133	2133-2134	2134-2135	2135-2136	2136-2137	2137-2138	2138-2139	2139-2140	2140-2141	2141-2142	2142-2143	2143-2144	2144-2145	2145-2146	2146-2147	2147-2148	2148-2149	2149-2150	2150-2151	2151-2152	2152-2153	2153-2154	2154-2155	2155-2156	2156-2157	2157-2158	2158-2159	2159-2160	2160-2161	2161-2162	2162-2163	2163-2164	2164-2165	2165-2166	2166-2167	2167-2168	2168-2169	2169-2170	2170-2171	2171-2172	2172-2173	2173-2174	2174-2175	2175-2176	2176-2177	2177-2178	2178-2179	2179-2180	2180-2181	2181-2182	2182-2183	2183-2184	2184-2185	2185-2186	2186-2187	2187-2188	2188-2189	2189-2190	2190-2191	2191-2192	2192-2193	2193-2194	2194-2195	2195-2196	2196-2197	2197-2198	2198-2199	2199-2200	2200-2201	2201-2202	2202-2203	2203-2204	2204-2205	2205-2206	2206-2207	2207-2208	2208-2209	2209-2210	2210-2211	2211-2212	2212-2213	2213-2214	2214-2215	2215-2216	2216-2217	2217-2218	2218-2219	2219-2220	2220-2221	2221-2222	2222-2223	2223-2224	2224-2225	2225-2226	2226-2227	2227-2228	2228-2229	2229-2230	2230-2231	2231-2232	2232-2233	2233-2234	2234-2235	2235-2236	2236-2237	2237-2238	2238-2239	2239-2240	2240-2241	2241-2242	2242-2243	2243-2244	2244-2245	2245-2246	2246-2247	2247-2248	2248-2249	2249-2250	2250-2251	2251-2252	2252-2253	2253-2254	2254-2255	2255-2256	2256-2257	2257-2258	2258-2259	2259-2260	2260-2261	2261-2262	2262-
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(Join sheets !!!)

OBION COUNTY, TENNESSEE NO. 10





(Joins sheet 5)





1 Mile

5000 Feet

0

1000

2000

3000

4000

5000

1:15840

(Joins sheet 13)

Scale 1:15840

(Joins sheet 6)

0

1000

2000

3000

4000

5000

1:15840

(Joins sheet 23)

Scale 1:15840

(Joins sheet 13)

0

1000

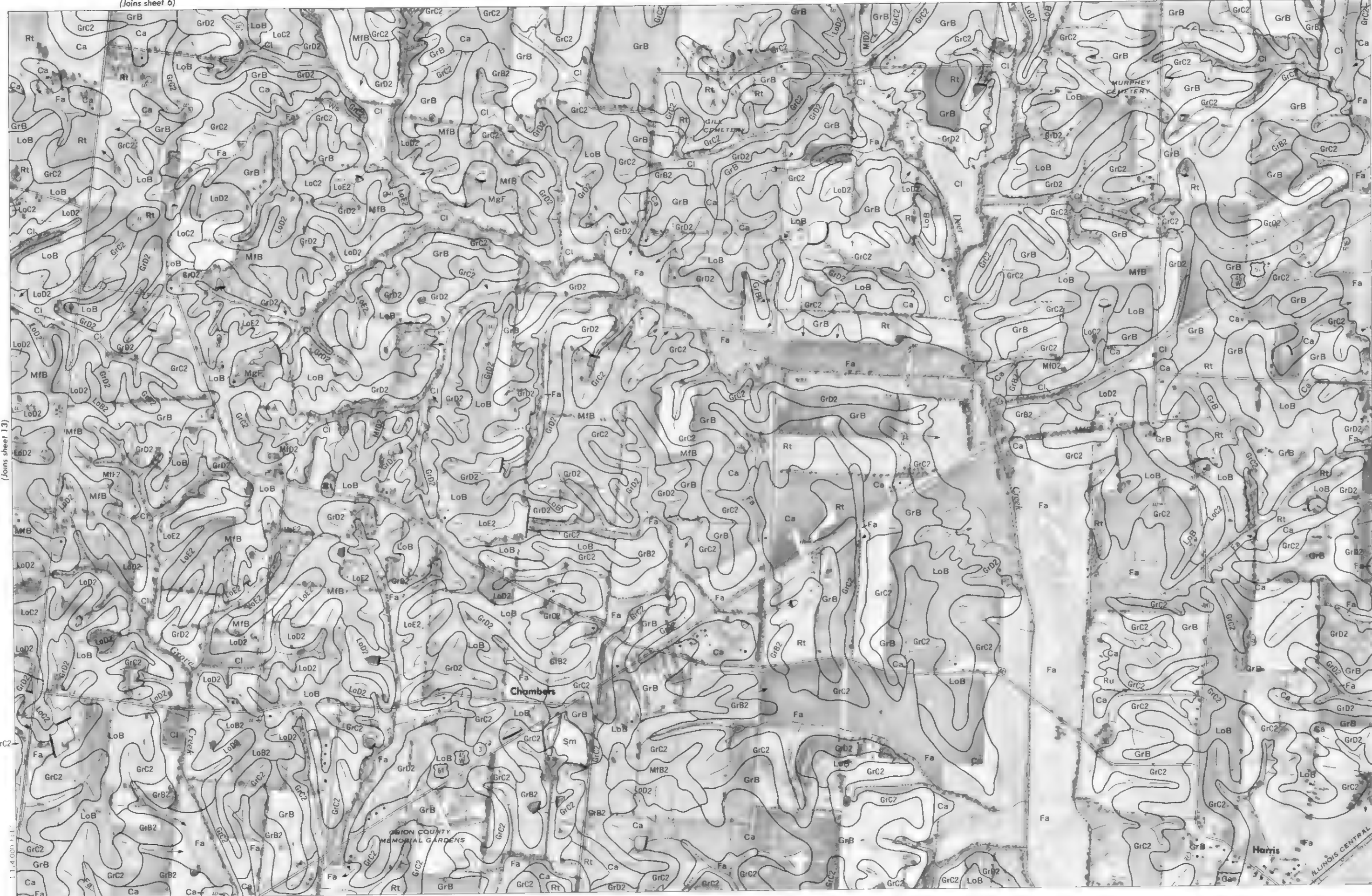
2000

3000

4000

5000

1:15840







(Joins sheet 9)

761 000 FEET



1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 17)



748 000 FEET

(Joins sheet 27)

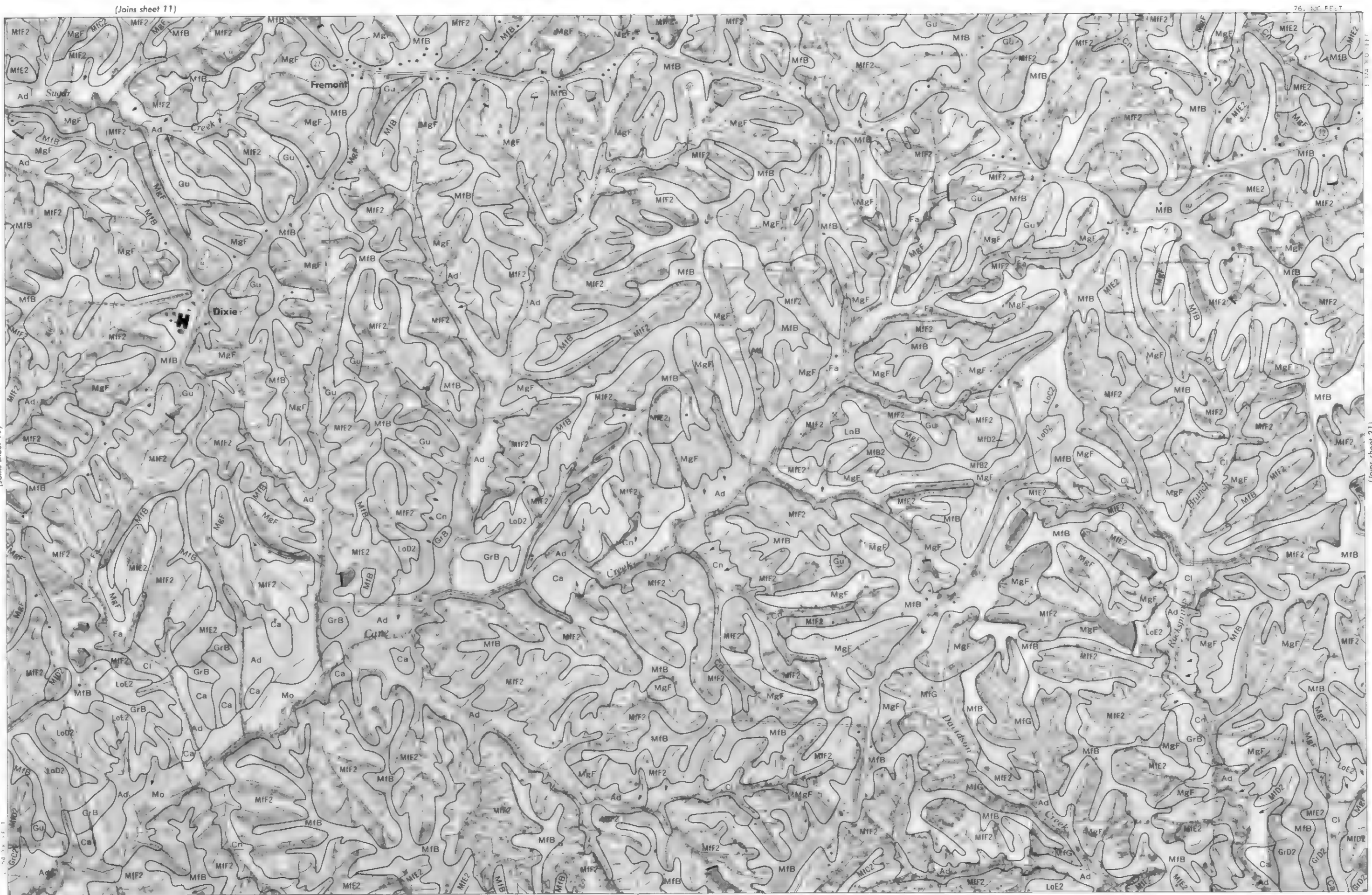
OBION COUNTY, TENNESSEE — SHEET NUMBER 19
(Joins sheet 19)





1 Mile
5000 Feet

Scale 1:15840
(Joins sheet 19)



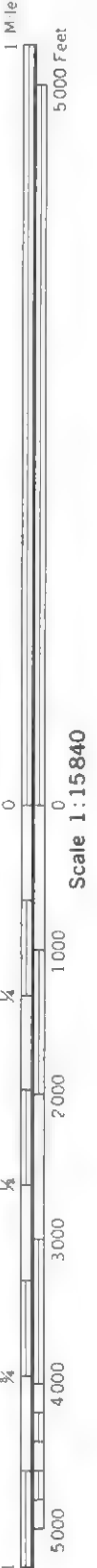


OBION COUNTY, TENNESSEE NO. 21

(Joins sheet 20)

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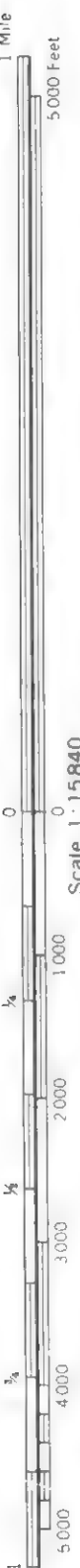


(Joins sheet 30)

745 JOE FEET

(Joins sheet 13)

761 000 FEET



Scale 1:15840
(Joins sheet 21)



(Joins sheet 31)

(Joins sheet 23)

OBION COUNTY, TENNESSEE



Scale 1:15840
(Joins sheet 23)



(Joins sheet 15)

76,000 FEET

1154 000 FEET

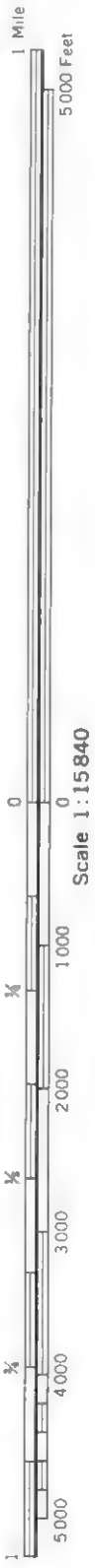
OBION COUNTY, TENNESSEE NO. 24

(Joins sheet 25)

(Joins sheet 33)

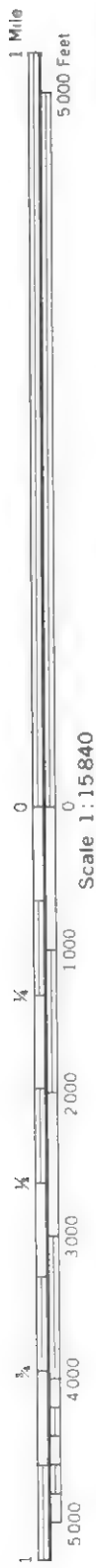
748 000 FEET

OBION COUNTY, TENNESSEE NO. 25



(Joins sheet 34)

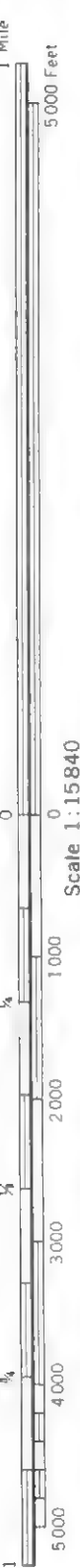
748.000 FEET





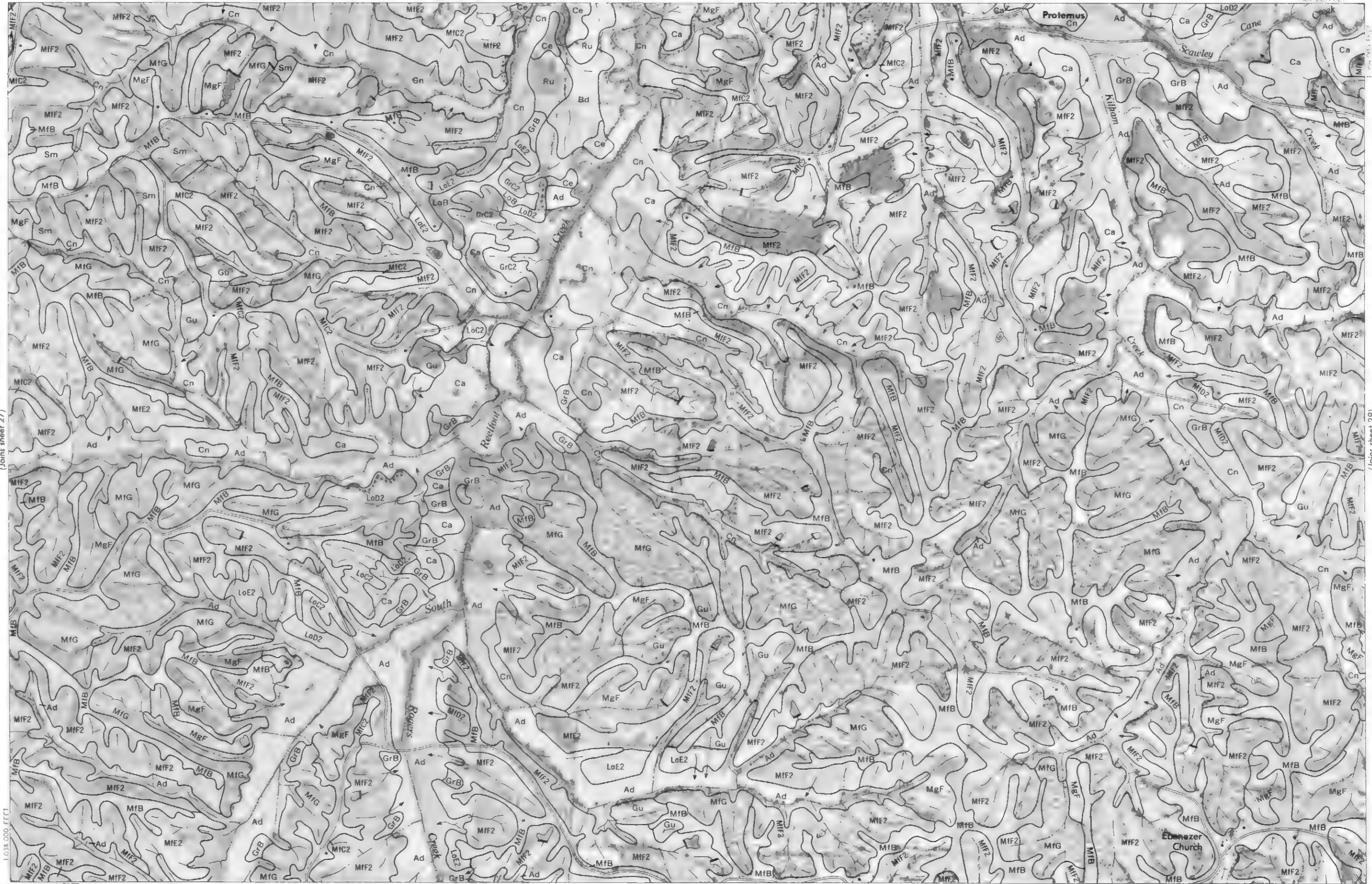
(Joins sheet 19)

745 000 FEET



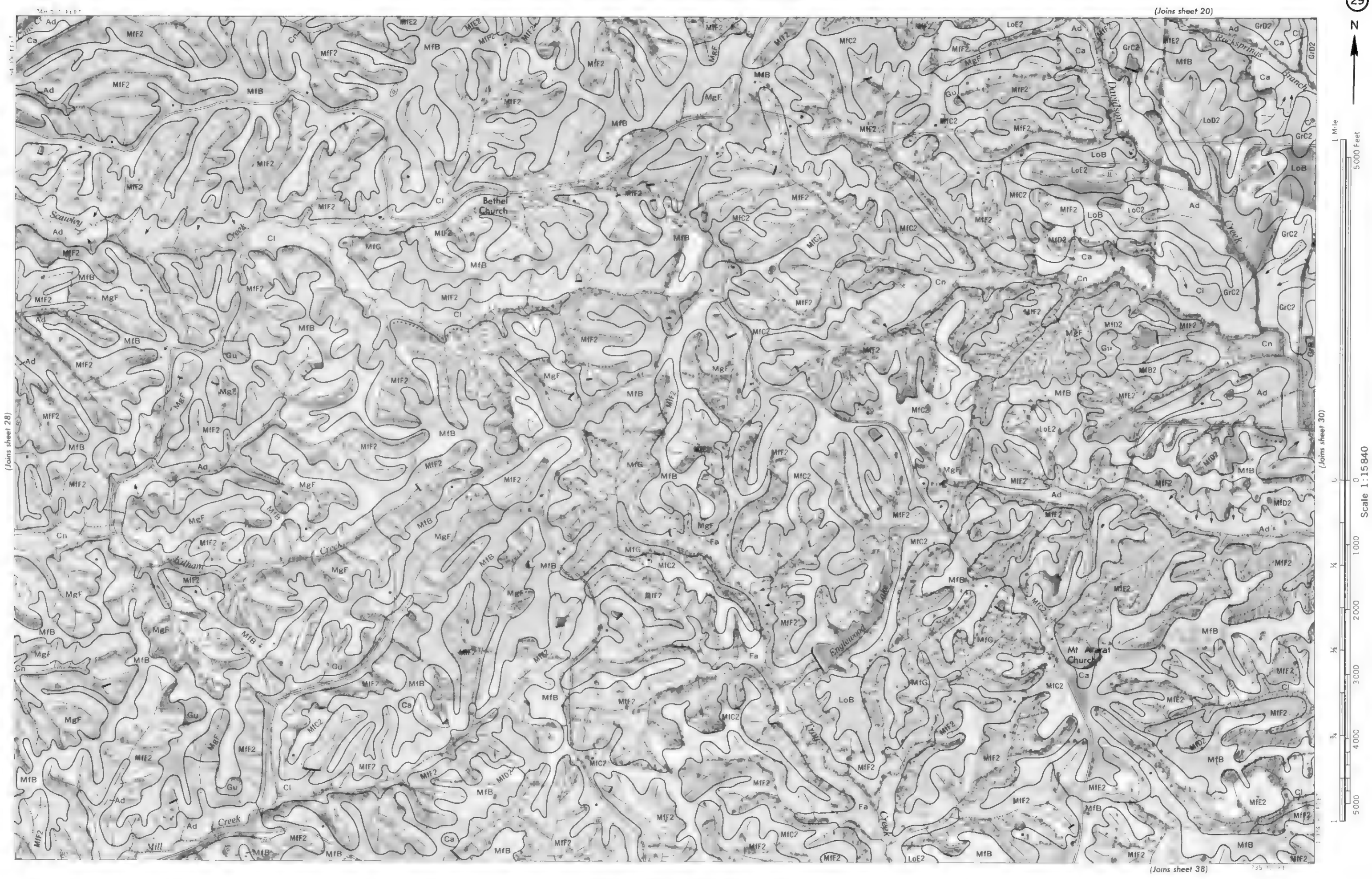
Scale 1:15840

(Joins sheet 27)



(Joins sheet 29)

735 000 FEET (Joins sheet 37)





748,000 FEET

(Joins sheet 22)

745,300 FEET

1 Mile

5,000 Feet

Scale 1:15840

(Joins sheet 30)

(Joins sheet 32)

(Joins sheet 40)



(Joins sheet 33)

OBION COUNTY, TENNESSEE NO. 32

(Joins sheet 41)

(Joins sheet 25)

748 000 FEET



1 Mile

5000 Feet

(Joins sheet 33)

Scale 1:15840

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2000

2000

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4000

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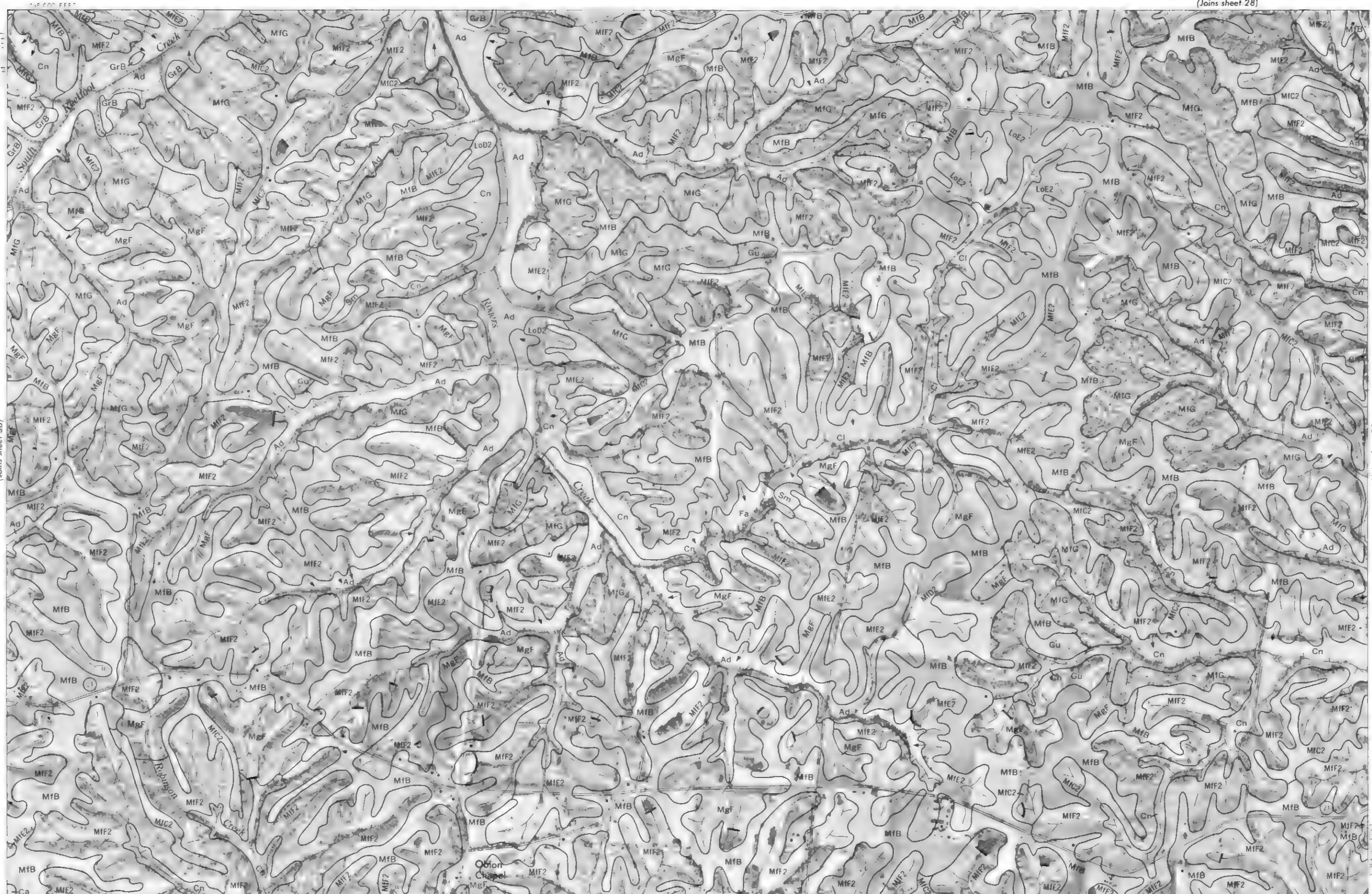
5000



735 000 FEET

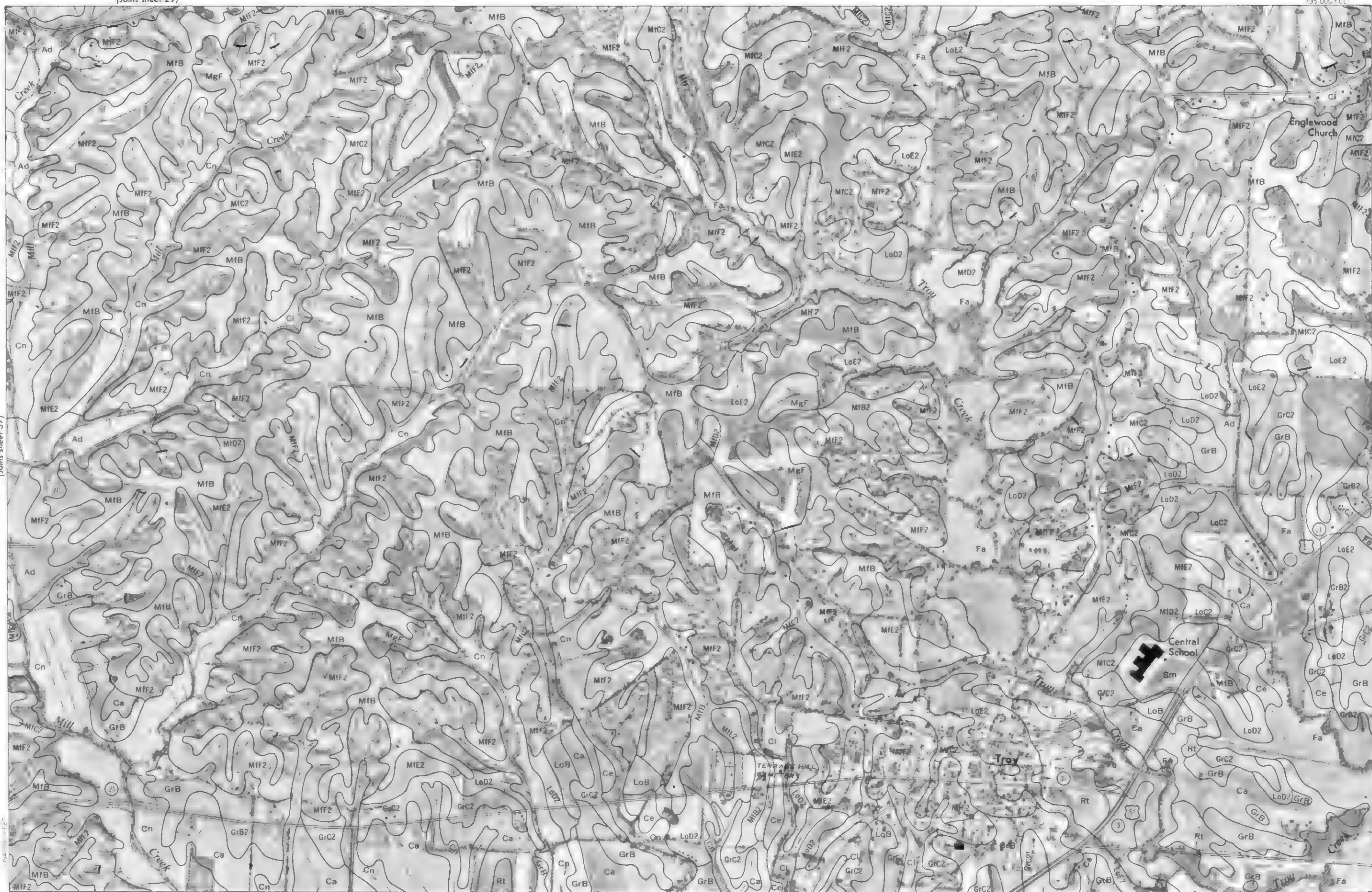
735,000 f - f -





(Joins sheet 29)

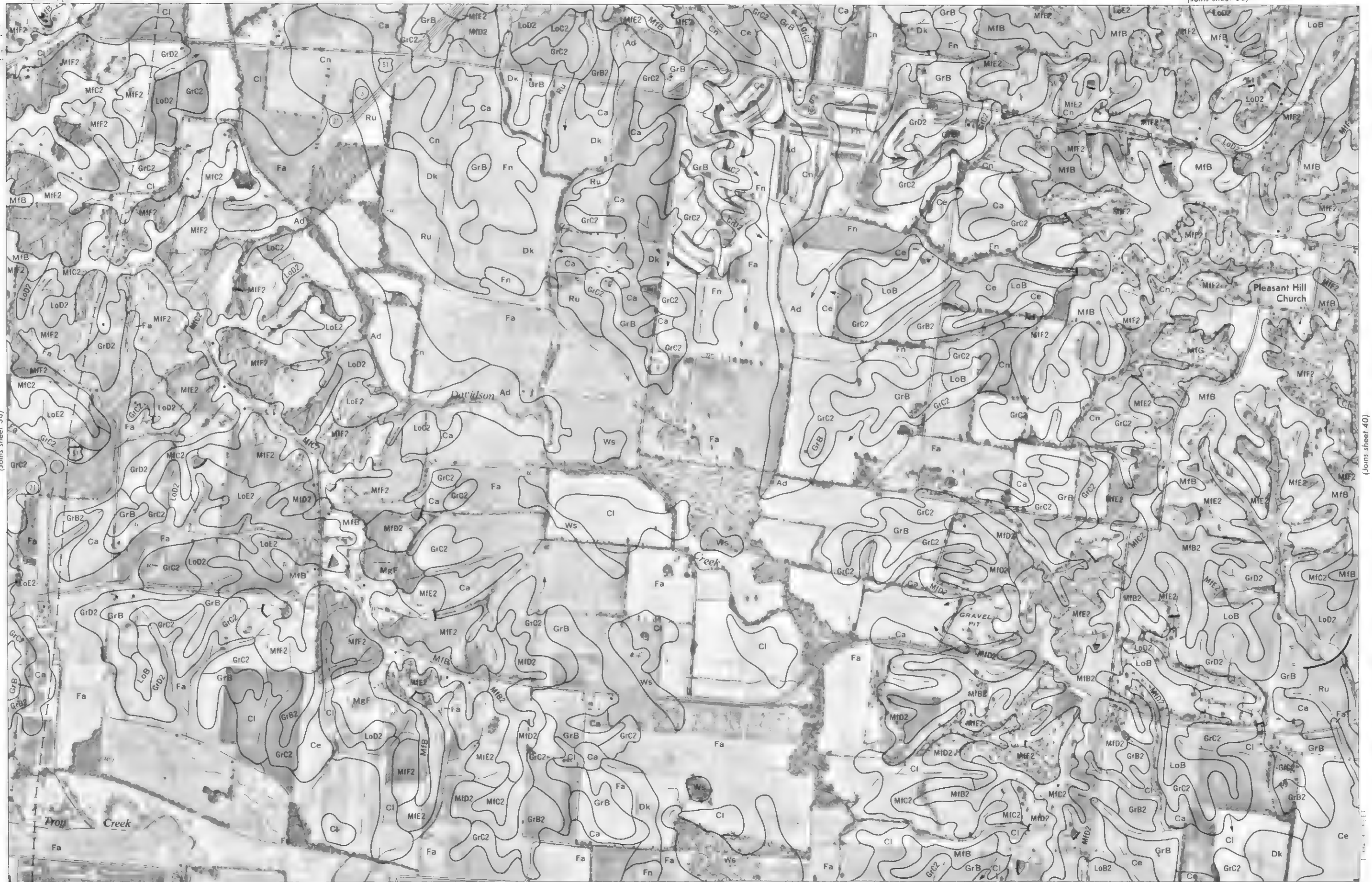
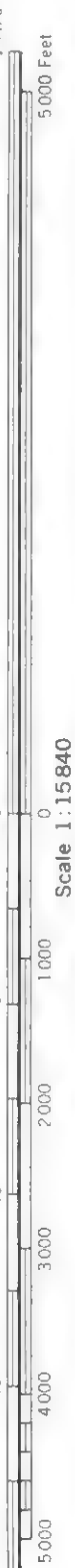
735 000 FEET

1 Mile
5000 FeetScale 1:15,840
(Joins sheet 37)

(Joins sheet 45)

(Joins sheet 39)

(Joins sheet 30)



(Joins sheet 46)

OBION COUNTY, TENNESSEE NO. 39

(Joins sheet 38)

(Joins sheet 40)

(Joins sheet 31)



1 Mile
5000 Feet

Scale 1:15840
(Joins sheet 39)



(Joins sheet 47)



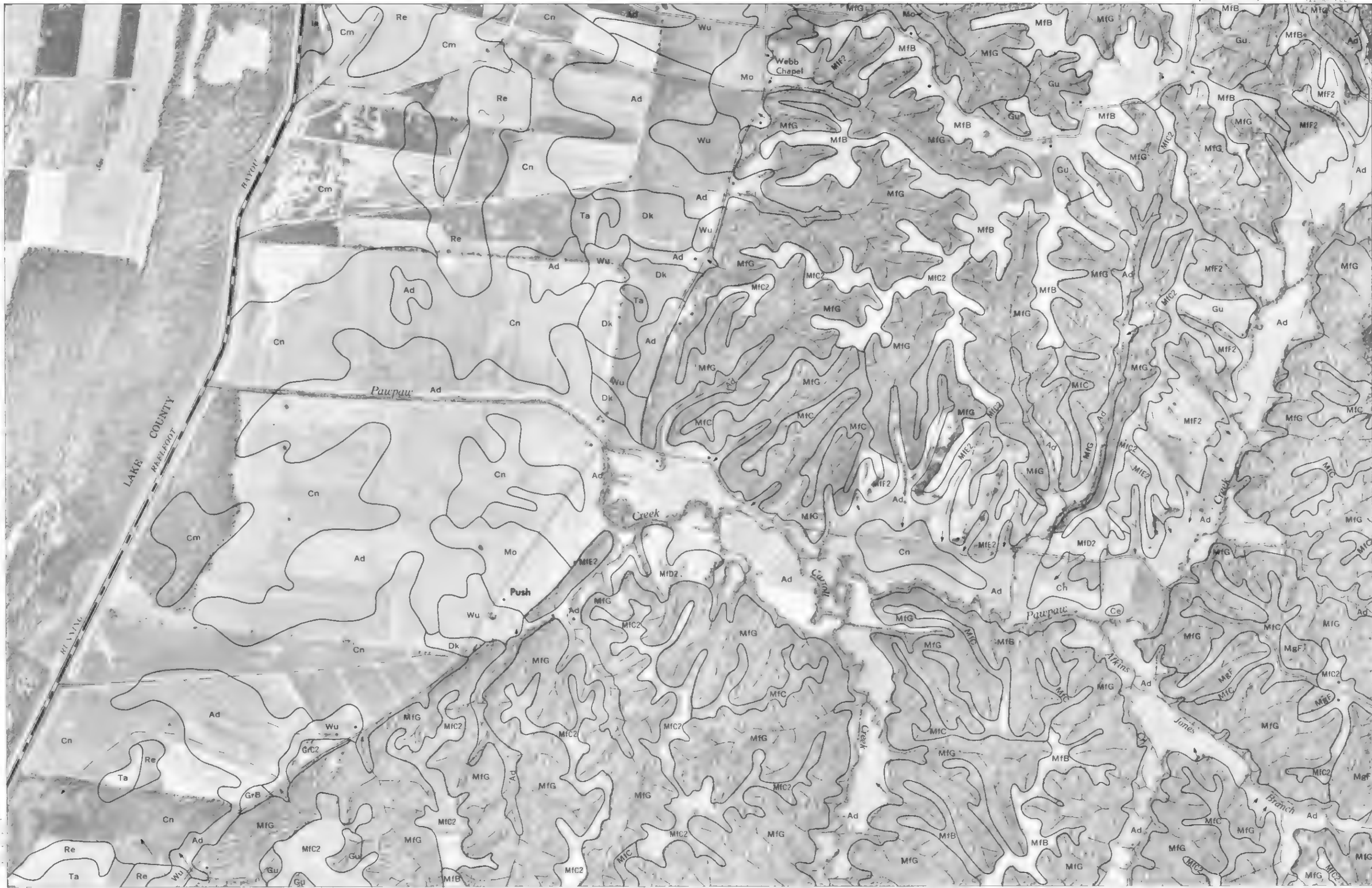


1 Mile
5000 Feet

Scale 1:15840



(Joins inset, sheet 49)



(Joins sheet 35)

722 100 FEET

(Joins sheet 43)

OBION COUNTY, TENNESSEE NO. 42

709 000 FEET

(Joins sheet 50)

OBION COUNTY, TENNESSEE NO. 43

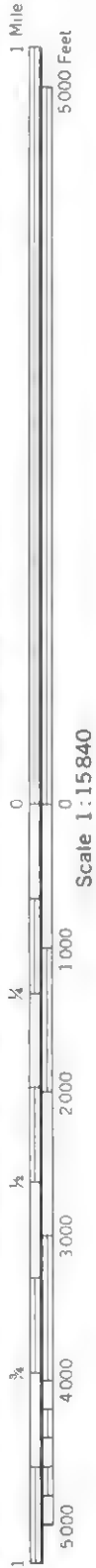


(Joins sheet 42)

(Joins sheet 36)

(Joins sheet 44)

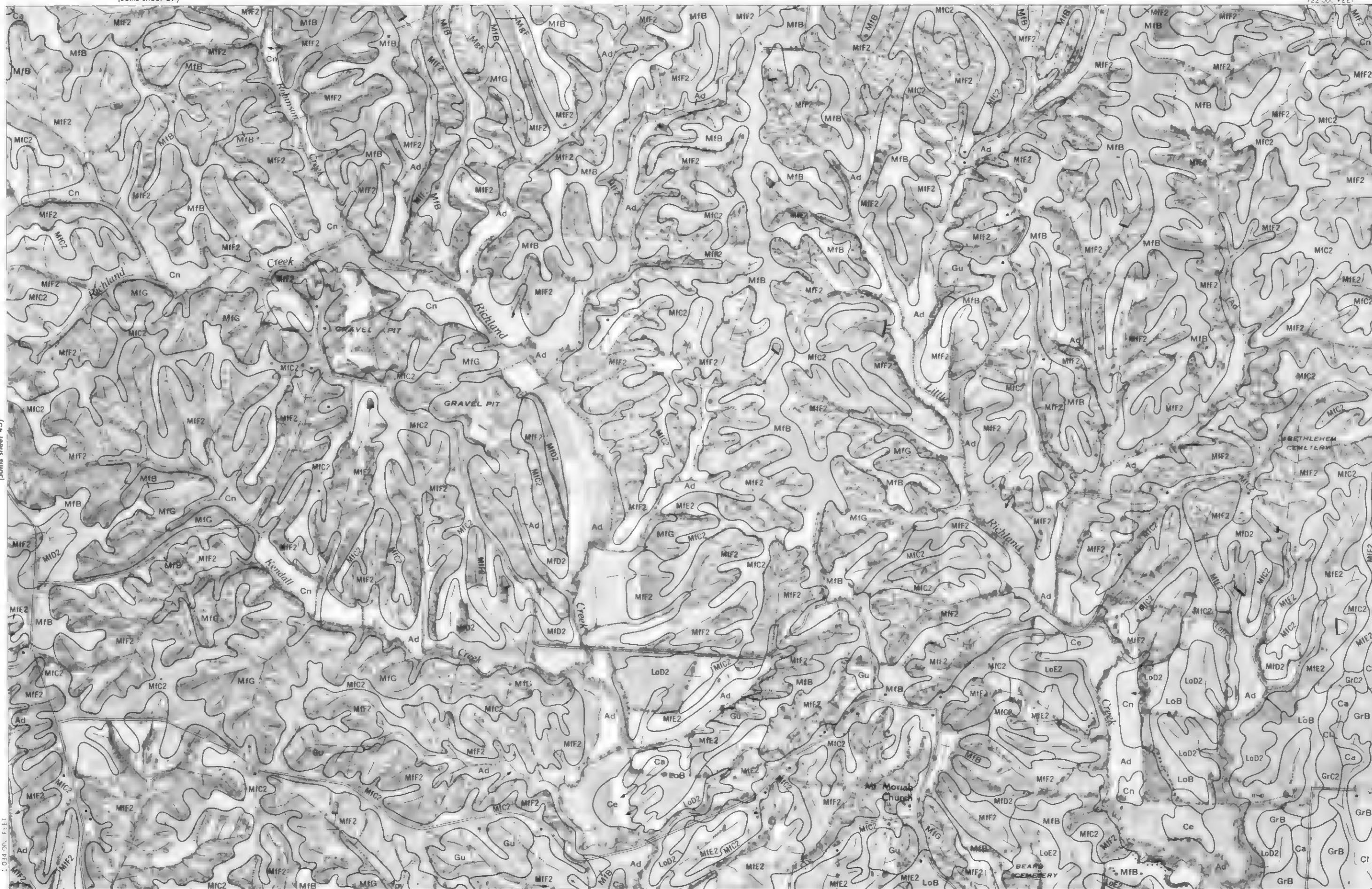
(Joins sheet 51)



Joining sheet 15)

Scale 1.15840
(Joins s

(Joins sheet 52)



(Joins sheet 38)



1 Mile
5000 Feet

Scale 1:15840

(Joins sheet 46)

(Joins sheet 53)



OBION COUNTY, TENNESSEE NO. 45

(Joins sheet 44)



1 Mile
5000 Feet

Scale 1:15840
(Joins sheet 45)



(Joins sheet 54)

(Joins sheet 47)
OBION COUNTY, TENNESSEE NO. 46

(Joins sheet 40)

OBION COUNTY, TENNESSEE NO. 47

(Joins sheet 46)



(Joins sheet 48)

(Joins sheet 55)

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As a result, the model is able to capture the complex relationships between the variables and provide a more accurate prediction of the outcome.

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[illegible]

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Scale 1:15840
(Joins sheet 47)

(Joins sheet 56)

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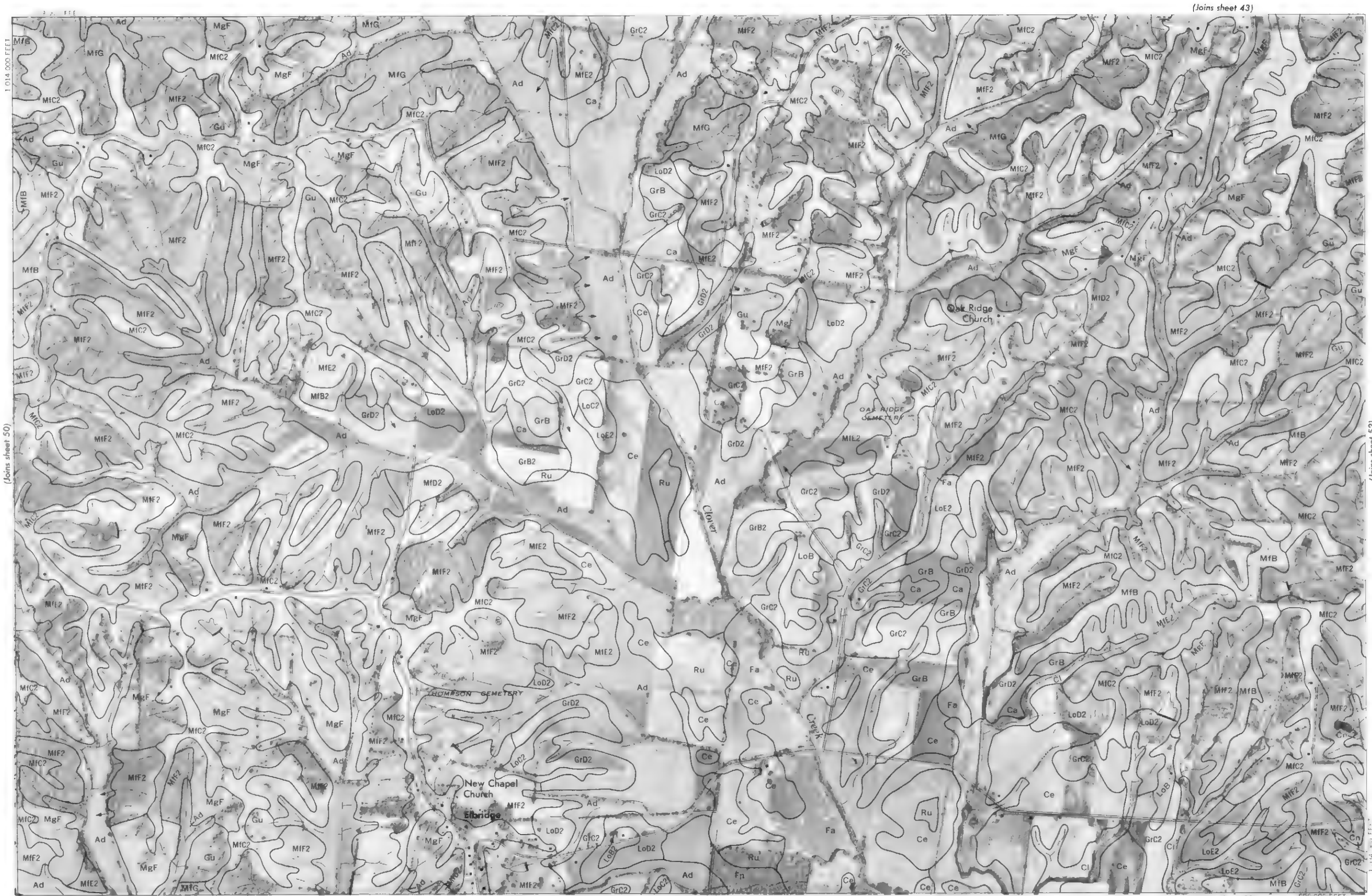


(Joins sheet 5)

(Jains sheet 49)

(Joins sheet 51)

(Joins sheet 43)



1014 000 FEET

(Joins sheet 50)

(Joins sheet 52)

1036 000 FEET



(Joins sheet 59)

OBION COUNTY, TENNESSEE NO. 51



1 Mile

5000 Feet

Scale 1:15840
(Joins sheet 51)

0 1000 2000 3000 4000 5000
Feet



(Joins sheet 53)

(Joins sheet 45)



(Joins sheet 52)

(Joins sheet 54)

(Joins sheet 61)

6960 FEET

Scale 1:15840



N

1 Mile

5000 Feet



1 Mile

5000 Feet

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2000

3000

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Scale 1:15840
(Joins sheet 53)

(Joins sheet 46)



696 000 FEET

(Joins sheet 62)

709 000 FEET

(Joins sheet 55)

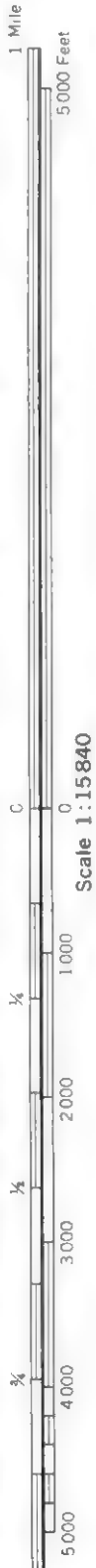
OBION COUNTY, TENNESSEE NO. 54

(Joins sheet 47)



(Joins sheet 63)

696,000 FEET



(Joins sheet 56)

1114,000 FEET

(Joins sheet 54)

709,000 FEET

OBION COUNTY, TENNESSEE NO. 55

(Joins sheet 48)

709 20 11



1 Mile
5000 Feet

Scale 1:15840
(Joins sheet 55)



(Joins sheet 64)





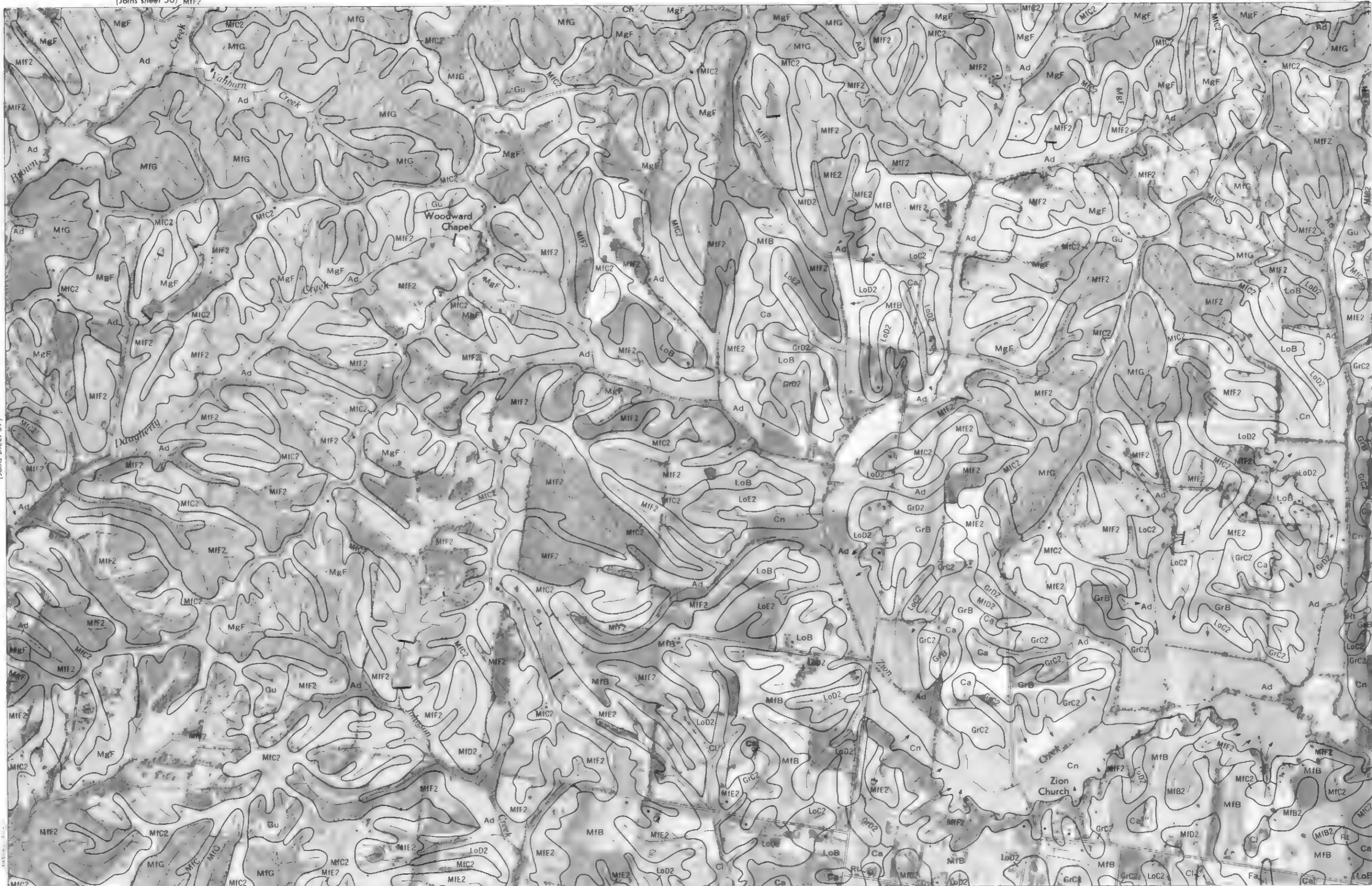
1 Mile
5000 Feet

Scale 1:15840
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696 00' ELEV



(Joins sheet 59)
OBION COUNTY, TENNESSEE NO. 58



(Joins sheet 52)



1 Mile
5000 Feet

Scale 1:15840
(Joins sheet 59)

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(Joins sheet 67)

OBION COUNTY, TENNESSEE NO. 61





1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 61)

(Joins sheet 54)

696 000 FEET

1094 000 FEET



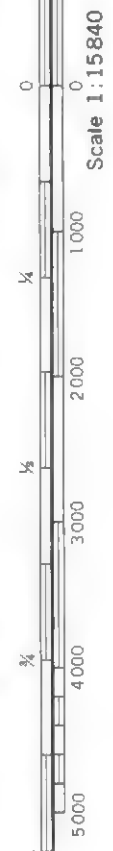
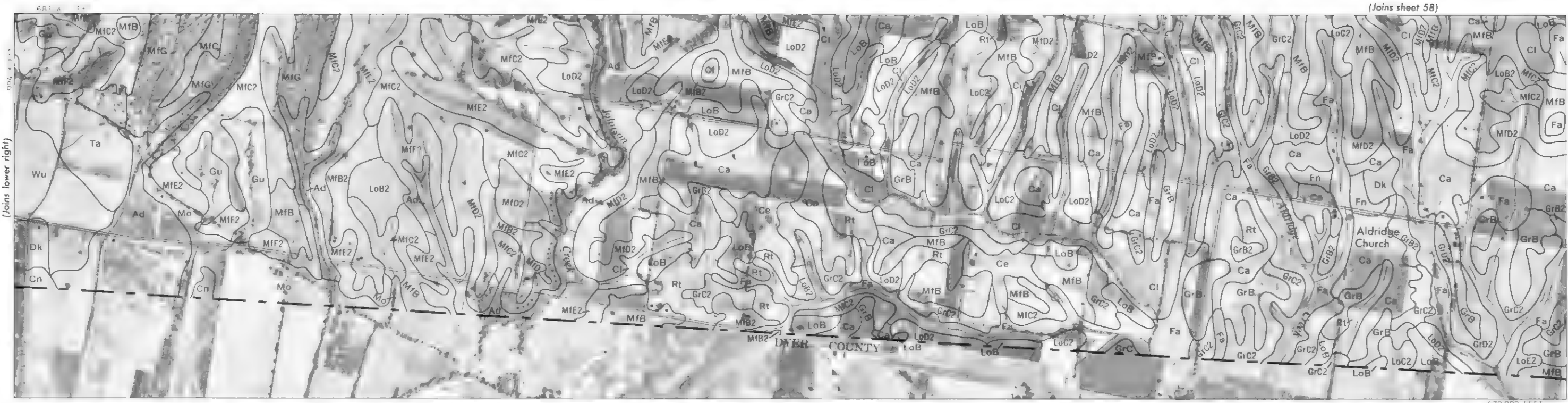
693 000 FEET

(Joins sheet 69)

OBION COUNTY, TENNESSEE

(Joins sheet 63)





OBION COUNTY, TENNESSEE NO. 65



Scale 1:15840

(Joins sheet 59)



(Joins sheet 67)

(Joins sheet 60)



OBION COUNTY, TENNESSEE NO. 67

(Joins sheet 61)

683 000 FEET



1 Mile

5000 Feet

(Joins sheet 67)

Scale 1:15840

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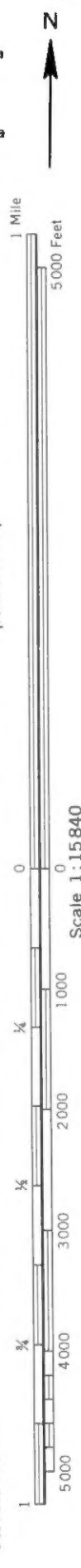
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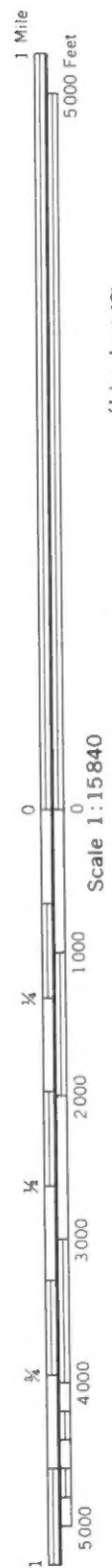


OBION COUNTY, TENNESSEE NO. 69

(Joins sheet 68)

(Joins sheet 70)





(Joins sheet 69)

(Joins sheet 71)

OBION COUNTY, TENNESSEE NO. 70

(Joins sheet 64)

